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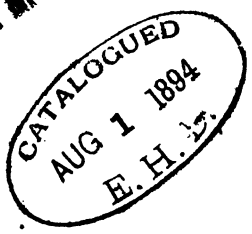

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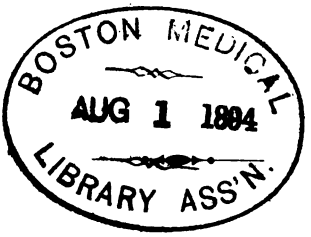
TRANSACTIONS

OF THE

CONNECTICUT

State Dental Association,

1864-5.



HARTFORD:
PRESS OF WILEY, WATERMAN & EATON,
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TRANSACTIONS

OF THE

CONNECTICUT

STATE DENTAL ASSOCIATION.

HARTFORD, September 15th, 1864.

DEAR SIR:—

We most cordially invite you to be present in this City on the 20th of October next, at Central Hall, to assist in organizing a State Dental Society.

You understand the objects sought by an organization of this kind: the advancement of its Members in professional knowledge, and the better establishment of fraternal love and good-fellowship. That there are individual and public benefits to be derived from a free interchange of professional opinions and experiences, must be obvious to every thinking man; and presuming that *you* are a *thinking man*, we call your attention to the subject, and ask your hearty co-operation.

That *esprit de corps* which is the soul of a professional body, has forever had a hard struggle to exist (if it has existed at all) among the Dentists of Connecticut.

Let us foster it till it animates the whole body, and the body shall cease to be dead earth, and become a living thing, rejoicing in its existence.

Very respectfully yours,

JAS. MCMANUS,
LEROY D. PELTON, } *Committee.*

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The foregoing Circular, issued by the Committee, was sent to the address of every Dentist in the State, whose name could be ascertained, and in accordance with said call, thirty-nine Dentists met in Central Hall, Hartford, on the 20th of Oct., 1864.

A temporary organization was effected by the election of Dr. E. E. Crofoot, of Hartford, as Chairman, and Dr. Jas. McManus, of Hartford, as Secretary.

Drs. Metcalf, McManus, Sheffield, Geer, and Pelton, were appointed to draft Constitution and By-laws.

Adjourned to meet at two, P. M.

Convention called to order at two, P. M., by the Chairman. The Committee appointed to draft Constitution and By-laws presented their report, which was accepted.

The Articles were taken up in order, read, and passed. The Dentists present signed their names to the Constitution, paid the initiation fee of three dollars, and became Members of the Connecticut State Dental Association.

The Convention proceeded to the election of officers, resulting in the choice of the following named gentlemen:—

Dr. A. HILL, Norwalk, *President.*
Dr. W. W. SHEFFIELD, New London, *V. President.*
Dr. JAS. MCMANUS, Hartford, *Rec. Secretary.*
Dr. LEROY D. PELTON, Hartford, *Cor. Secretary.*
Dr. E. E. CROFOOT, Hartford, *Treasurer.*
Dr. CHAS. P. GRAHAM, Middletown, *Librarian.*

Executive Committee.

Dr. SAM'L MALLETT, New Haven.
Dr. JOHN T. METCALF, "
Dr. H. J. STEVENS, "

Dr. A. Hill, on taking the Chair, delivered the following brief ADDRESS:—

In my judgment, gentlemen, the organization of this Society is the commencement of an era of much importance in the his-

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tory of the Dental profession in our State. It is an event which I have long desired to see accomplished, and in which I am delighted to participate. We have been left far in the background by our sister States, in this respect; even the younger States of the West, and the far off Mississippi Valley, are far in advance of us, having their State and County organizations all over this extended region. As a profession we have suffered great loss, and have labored under many disadvantages, for the want of such professional and social intercourse as these Associations are best fitted to supply. Mutual shyness and disreputable jealousies have been the offspring of this lack of fellowship; and we have been wont to regard each other with distrust, simply because we did not know each other better. But our meeting to-day gives promise of a change as auspicious as the most sanguine would dare to anticipate. I confess myself most happily disappointed in the number and spirit of those who have convened on this occasion. The different portions of our State are well represented, showing how deeply they are interested in the organization of this Society; and I am delighted as well with the spirit as with the numbers here present. A thousand nameless advantages will accrue to us, if, in the true spirit of our noble profession, we zealously unite in contributing our individual quotas to maintain and perpetuate the interest of such Associations.

Let us resolutely purpose that this Society shall be a model one of its kind; lacking no element that can either ennoble the profession, or bless the community in which we live.

Voted, That the Treasurer pay all orders drawn on him by the Secretary, and signed by the Chairman of the Executive Committee.

Voted, That the Executive Committee constitute the Auditing Committee.

An invitation from Mr. J. H. Ashmead, inviting the Members of the Association to visit his residence at eight, P. M., was read. The invitation was accepted, and a vote of thanks passed.

The subject of Hard Rubber patents was brought before the Association. Remarks were made on the subject by Drs. Mal-

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lett, Metcalf, J. H. Smith, and C. L. Smith, of New Haven, Dr. Sheffield, of New London, and Drs. Riggs and Crofoot, of Hartford, respecting the claim of the Boston Company for tribute, all agreeing that the claim was unjust, and should be resisted. Dr. Metcalf, of New Haven, offered the following:—

Resolved, That the limited state of information on the subject of Hard Rubber patents, renders it inexpedient for us at present to purchase licenses to use it. Adopted.

Dr. Hill offered the following:—

Resolved, That the Members of this Association hold themselves in readiness to contribute the sum of ten dollars each to the Boston Protective Union, for the purpose of defense against prosecution, for using the Hard Rubber base for artificial Teeth, whenever, in the judgment of the Executive Committee, it shall be deemed expedient. Adopted.

On motion, adjourned to meet at the residence of Mr. Jas. H. Ashmead at eight, P. M.

Mr. Ashmead received the Members most cordially at his beautiful residence, on Wethersfield Avenue. After a pleasant hour spent in social intercourse, we were ushered to the Dining Hall, where a bountiful table was spread. Those present did justice to the tempting array of good things prepared for them, and mirth and humor reigned supreme.

The President, Dr. Hill, tendered the thanks of the Association to Mr. Ashmead for his generous hospitality, in a few well chosen remarks, which were warmly applauded.

On motion of Dr. E. E. Crofoot, Jas. H. Ashmead, Esq., was unanimously elected the first Honorary Member of this Association.

Dr. I. Woolworth, of New Haven, favored the company with a few remarks, and was appointed to prepare a paper on the Preservation of the Teeth of the rising generation.

At ten, P. M., after a most enjoyable evening, the Association adjourned to meet in Hartford the third Tuesday in May, 1865.

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HARTFORD, May, 16th, 1865.

The Association called to order by the President, Dr. A. Hill, of Norwalk, at eleven, A. M.

The minutes of preceeding meeting were read and approved.

Report of Corresponding Secretary read and accepted.

Report of Treasurer read, referred to Auditing Committee, and approved.

The following new Members were elected:—

Dr. THOS. S. SCRANTON, of Madison.
Dr. JOHN CODY, of Hartford.
Dr. G. B. BOUTWELL, of Ansonia.
Dr. G. A. GRACE, of Meriden.
Dr. A. E. STRONG, of New Haven.
Dr. H. D. SYDLEMAN, of Norwich.

Honorary Members.

WM. H. ATKINSON, M. D., D. D. S., of New York.
Dr. GEO. A. MILLS, of Brooklyn.
Dr. C. E. FRANCIS, of New York.
Dr. H. M. MILLER, of Westfield, Mass.

The discussion of the means of controlling the flow of Saliva was opened by Dr. Wm. H. Atkinson, who spoke as follows:—

The very best possible means of controlling excessive flow of Saliva, while operating in the mouth, is to secure a perfect compatibility between the patient and operator. But so few care to even consider this desirable condition, that we are forced in the main to resort to second rate methods.

First among which, I would name exhaustion of the supply by finishing all excavating to be done at that sitting; and then using sheet rubber around the tooth or teeth; which, when once well adjusted, we are enabled to proceed at our leisure, a necessary condition to performance of the best style of filling. Where there is great repugnance on the part of the patient to the rubber, I would resort to napkins, nicely adjusted, so as to isolate the cavity about to be filled. By a little earnest effort, the

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operator will soon acquire facility in the adjustment of rubber or napkins.

Adjourned to two, P. M.

Association called to order by the President, Dr. A. Hill, at two, P. M. Minutes of morning Session read and approved. As required by the Constitution, the President delivered his

ADDRESS.

GENTLEMEN:—

The interval of our separation has elapsed—and we are brought together in accordance with our preconcerted plans, to inaugurate, in a more formal manner, the State Dental Association of Connecticut. I greet you on this occasion with much pleasure, and beg to congratulate you on the cheering auspices under which we are permitted to assemble.

When we last met, our nation was boiling and seething under the influence and rage of a fearful war. The skies were dark and angry with portentious clouds. The future was shrouded with dread uncertainty.

And while we were *hoping*, and *believing*, and *struggling* for the best, yet no human eye could penetrate the misty folds of the dark, uncertain future.

But now, *thank God!* those dark clouds have lifted; and as they roll away, the bright sun of peace once more shines upon them, and fringes their margin with his golden radiance; and the beautiful bow of promise and of hope spans the dark background, and rides away upon the clouds.

If you have felt as I have, Gentlemen, you have, at times, found yourselves with scarcely heart enough to pursue, with interest, the ordinary business of life.

One great, absorbing interest has challenged your attention, and a constant solicitude for the welfare of our common country has precluded the possibility of intense devotion to mere professional pursuits.

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You sought the latest news of the evening, and with the dawn came anxious waking hours.

Your *brothers, sons,* or *neighbors,* were in the fray; and the welfare of the nation was the stake in the game. And how could you go to the office, or laboratory, without a weight upon your heart?

O, Gentlemen! you must indulge me for a moment, in these passing reflections; and join with me in devout thanks-givings to the Great Ruler of the Universe, that he has most graciously lifted this terrible incubus from the heart of the Nation.

And although we have but just left the sad—the imposing—and, I may say, *most sublimely impressive* funeral cortege of our murdered President; yet, amid our tears, there is joy—and in our mourning we rejoice.

The Nation lives! Thanks be to God! And the Nation's life is far more important than the lives of all who have fallen, precious as those lives may be.

There is a *future* for ourselves, and our children. We have something yet to live for.

And, now, with increasing zest and vigor, we may plunge into our professional labors, and work out for ourselves the destiny that awaits us.

As individual Members of an honorable profession, it is fair to presume that we have accorded to us, by the community in which we live, our appropriate status. And that we each of us wield the influence to which we are justly entitled.

But what shall be the character of our Association? And what can we do for each other and the public around us? These are questions which address themselves to us on the present occasion with great pertinence and fitness.

Shall our organization become a mutual admiration Society merely, or shall we lay broad and deep the foundations of an honorable structure, that shall wield an influence for good, when we shall have passed away, as our fathers have gone before us?

I trust that a mere ephemeral existence will not satisfy the purposes and designs of those who are present to-day, and who may unite in the organization and working of this Association.

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While it does not become *me* to dictate, it may nevertheless be appropriate to suggest.

Therefore, by your leave, I will proceed to make such suggestions as may befit my position as your *first* Presiding Officer, and the circumstances of the present occasion.

To save us from disintegration and dissolution, there must be a *common interest*, and *that* interest must be *perpetual*.

We shall find this interest in our *mutual improvement*, if we do not withhold our individual contributions to the common stock.

Now, there *may* be *individuals* who could get along very well without the aid of such Associations. But I shall do no injustice to such, if I should say that no *one* man knows *everything*. And he must be a very dull scholar who cannot learn some valuable lesson from an inferior mind.

It is the aggregate of little things that constitutes the great mass. And if every Member of this Association will contribute his mite, it will be found that each of us shall carry hence more than we brought together.

A single suggestion—a simple hint, is often of greatest value. Especially where we are pursuing a course of investigation, or experiment, and have come to a dead halt, for the want of a simple hint, which some brother may supply.

I, myself, have been years in experiment to achieve a given result. With my mind awake, and quick to apprehend, I have seized with avidity the merest *shadow* of a hint, by which the whole field of thought has, at times, opened before me.

Now, there are some things which we never can learn until we reach a given point in our mental operations. We must have the *susceptibility*, *even* to make a hint available.

And coming together, as we will, each from his office, or laboratory, with some special line of thought ever before us, it is but fair to presume, that while each of us may add to the common stock, all of us may be enriched as individuals.

The mind is always *quick* upon *those subjects* that *most deeply* engage our attention. How then is it possible, where so many are working in the same field, that we can spend a few days together, earnestly canvassing the *same* subjects, without deriving a marked advantage?

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Another great object we should ever have in view, in our meetings, should be the *public good.* The great end of life is not self-agrandizement.

He who never gets out of himself, knows not what it is to live. We *best* serve ourselves, when we are serving others well. Our object should be to make the *most* of *ourselves*, by enlarging the scope of our own lives.

And thus it will always be, that while we are nobly and heroically working for the public good, by a reflex influence, as certain as the law of gravitation, we are lifted up into a nobler sphere of individual existence.

This thought should ever save us from mean and petty jealousies. If a worthy brother can outstrip us in the race for personal eminence and distinction, let us not try to pull him down to our own level, but bid him *God-speed*, and push on after him as fast as we may.

In coming together on such an occasion, let us lay aside our *green* glasses, lest we should come to think that all around us are *green.*

In other words, let us disabuse our own minds of prejudice, which will never permit us to do justice to another, especially a professional rival.

For one, I can most truly say, I desire to make myself rich in *all* useful knowledge. And although I have labored with some degree of assiduity to practice my profession worthily, I have never confined my studies, or pursuits, to the practice of Dentistry alone.

And in my intercourse with the profession, I have found that *such* is the case with not a few. The by-paths of Science are always open and inviting. And the mere title of Dentist should not be regarded as a complete synonym for one who knows nothing outside of the curriculum of Dental operations.

Scientific pursuits are always ennobling. And Dental Science is kindred to Medical Science, and Medical Science intermeddles with *all* knowledge.

Our object should be to round out our characters by the ennobling pursuits of all kindred sciences.

Truth, is *one.* A truth on *one* subject, is in harmony with truth on *all* subjects. And when we strike *one grand truth*, we

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have the *key-note* of all. Let us have courage to follow wherever truth may lead the way, and we shall always be safe.

Our Association contemplates the development of truth as it exists in *Dental Science.*

And we have before us an important field, already "white to the harvest." We come hither as *reapers* and *gleaners.*

In some respects, we reap the fruit of those who have toiled in this field before us, and have sown broadcast around them the precious seed which now waves as a golden harvest.

In other respects, we are *pioneers* and *explorers* in a field of undeveloped thought. We are following a "lead" that will open up a new mine of professional treasures.

Some of us come as *gleaners*, picking up the precious grains which have been left unnoticed by others. We are what the great Bard of Avon calls

"*Snappers up of unconsidered trifles.*"

But let our relative position be what it may, there is work enough for us all. And I may add,

"*Ample scope, and verge enough.*"

We do not *all* excel in the *same* speciality. We do not *all* feel equal interest in the *same class* of operations. Our peculiar genius and habits fit us for some *one* class of operations better than another.

Some can scarcely endure the *laboratory.* They prefer the operations of the *chair.* Others, following the bent of taste as of inclination, prefer *Dental mechanics.* And this is well. Let each one follow the department best suited to his taste, and he will find that in such a sphere, he may surely win distinction.

But in our Association we bring together our various contributions, and we are all enriched together.

In coming together thus, bringing with us the results of our varied experiences, and in the true spirit of professional courtesy and brotherhood, *one* result must certainly follow—to wit: the elevation of our profession, as a whole, and our own individual status.

But in order that we may reap the full benefit of this Asso-

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ciation, let me make this suggestion—viz.: *Don't be in a hurry to go home. Let us take time to compare notes. To compare notes fully.*

It is no small matter for a body of Dentists to get together, as we are here this day. And it would be most unwise to lose the benefits of our meeting, for the want of *one additional* day.

To give interest to our meetings, and dignity to this Society, it is quite important, it seems to me, that our archives should be enriched with *elaborate papers* on different branches of Dental Science. I would, therefore, suggest that provision be made to secure such at all our subsequent gatherings. These, together with *stenographic* reports of our discussions on the various topics propounded by the Executive Committee, would add greatly to the value of our Associations.

Another subject has occupied my thoughts for some time past, which I will venture to name for your consideration.

Why should we not have a *Dental College* in *New England?* Why should we not have one in *Connecticut?*

Why must all our young men from the British Provinces, in the East, and all this large territory, embracing the New England States and the Canadas, be compelled to go to *Philadelphia* or *Cincinnatti*, to secure the advantages of a Dental Collegiate education? Have we not within our State, one of the most renowned and excellent seats of learning in this country?

And why may we not attach a Dental department to venerable old *Yale*, and thus challenge the consideration of young men throughout the country? Let us consider these interrogatories.

I am still on the hither side of fifty. Nor can I realize that I am even *near* half a century old. And yet the grandest developments in Dental Science have occurred within, not the period of my *life merely*, but within the period of my *professional history*.

Some thirty years I have been engaged in Dental practice, and within that brief period, I have marked the organization of the first National Dental Society in America, if not in the world.

About twenty five years ago, a company of distinguished Dentists met in the City of New York, in Convention, and resolved to organize a Society. A Committee was appointed to draft a Constitution, of which Dr. Vernon Cuyler, of this city,

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(Hartford,) was a Member. And thus originated the "*American Society of Dental Surgeons*," composed of some of the most distinguished Dental practitioners in the world.

I ought to say, perhaps, that there was a Dental Society previously existing in the City and State of New York, but none of a *National character*, prior to this period. About the same time, the Baltimore College of Dental Surgery sprang into existence—the *first* institution of the kind in the world.

Not far from the same period, the first number of the "American Journal of Dental Science" was published; edited by C. A. Harris, of Baltimore, and Eleazar Parmley, of New York.

And thus sprang up a *literature*, the value of which cannot now be estimated.

I love to think of those fathers in the profession, upon whose steps I, then a mere boy, waited with reverence and delight. I can but feel proud that it was ever my pleasure to know, and personally converse, with such men as Horace Hayden, Chapin A. Harris, and others, of Baltimore. With L. S. Parmley, of New Orleans; Elisha Baker, Eleazar Parmley, Solomon Brown, and other distinguished practitioners of New York City. With McIlhenry, Gardette, Townsend, and others, of Philadelphia. With Maynard, of Washington; Flagg, of Boston, and other names of marked distinction.

And I well remember with what *trepidation* and fear, I appeared before a Committee of the "American Society," at Boston, to be examined for Membership in that Society.

But the Committee, of which Drs. Harris, of Baltimore, and Eleazar Parmley, of New York, were Members, made a favorable report, and I was admitted to Membership; and a Certificate of Membership, signed and sealed by the Officers of that Society, I hold at the present time.

But these fathers in the profession have many of them passed away, and it is sometimes a question with me, whether their equals, in all respects, remain. But the beautiful words of Longfellow are still appropriate:—

"Lives of good men all remind us,
We can make *our* lives sublime;
And in dying, leave behind us,
Foot-prints, on the sands of time."

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Gentlemen, let us labor to this end. Let us leave such "*foot-prints*" behind us, that those who come after us shall feel that we have not lived in vain.

Perhaps I should apologize to you, for detaining you so long from the business of this Convention, by my desultory, and somewhat incoherent address.

But throwing myself upon your indulgence, I beg to express my fervent desire, that we may live to see this Association eminently successful and prosperous.

The President announced the next business before the Association to be the election of Officers.

On motion of Dr. L. Parmlee, it was voted to suspend the rule requiring ballot, and that the present Officers retain their offices until the next annual meeting.

On motion of Dr. Sheffield, it was voted to hold our Semi-annual Meeting the first Tuesday in October, in the City of New London.

Reading of an Essay, by Dr. Isaac Woolworth, of New Haven, on the Past, Present, and Future of Dentistry.

On motion of Dr. J. H. Smith, of New Haven, it was voted that the Essay read by Dr. I. Woolworth, and the Address by the President, Dr. A. Hill, be furnished for publication in the "Dental Cosmos."

On motion of Dr. C. L. Smith, of New Haven,

Voted, That this Association tender a vote of thanks to Dr. Isaac Woolworth, of New Haven, for the valuable Essay read on this occasion.

An invitation was read from Mr. Jas. H. Ashmead, inviting the Members to visit at his residence, No. 10 College Street.

On motion of Dr. C. L. Smith, of New Haven,

Voted, That we accept the invitation, and visit him at his residence at eight, P. M.

An Essay was read by Dr. Sam'l Mallett, of New Haven, on Patience in Dentistry.

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Also one by Dr. W. W. Sheffield, of New London, on Means of Controlling Flow of Saliva.

Remarks were offered by Dr. G. A. Mills, of Brooklyn, N.Y., on Means of Controlling Flow of Saliva, and an instrument, prepared by Dr. Hawes, of New York, for that purpose, was exhibited.

Dr. Wm. H. Atkinson, by request, favored the Association with his views on the use of the mallet and wedge in filling approximal cavities; and by request of Dr. Hill, on the treatment of Teeth with an open abscess.

Adjourned to nine, A. M., Wednesday.

HARTFORD, May 17th, 1865.

Association called to order by the President at half-past nine, A. M. Minutes of previous meeting read and approved.

An Essay was read by Dr. John T. Metcalf, of New Haven, on Filling Approximal Cavities; also one on the same subject, by Dr. W. W. Sheffield, of New London.

Drs. Mallett and Smith, of New Haven, and Dr. C. E. Francis, of New York City, spoke at length on the same subject.

The President, Dr. Hill, proposed, as an Honorary Member of this Association, Dr. Chas. W. Ballard, of Darien, (Senator from 12th Senatorial District,) which was seconded by Dr. Jas. McManus, and unanimously carried.

Dr. Ballard offered some remarks upon the status of the profession at the present day. He alluded to the rapid progress of Dental Associations in this country, and referred to his having attended the meetings held, in past years, at Baltimore, Philadelphia, and New York, and the valuable improvements which have been so rapidly brought out by means of the fellowship and commingling which association fosters. Claiming that the profession of Dentistry deservedly stands in an equal rank with the other liberal professions, he urged the Members to emulate the noble efforts of those who have done so much in days past to elevate the profession, and that it is our duty to leave as good a record for those who come after us; and he believed

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that we can do this in no way so effectually as by associated efforts.

Dr. Hill spoke of the use of old, soft muslin, as an absorbent, in drying cavities, and keeping the mouth dry while operating.

Dr. C. E. Francis, of New York, claimed great advantages from the use of bibulous paper and rubber cloth.

Dr. Stevens, of New Haven, followed on the same subject.

Dr. J. M. Riggs, of Hartford, described his method of preparing and filling approximal cavities in the incisor teeth; also his theory of the cause of decay.

On motion of Dr. Metcalf, it was

Voted, That the Transactions of this Association be published under the direction of a Publishing Committee. The following were appointed as a Publishing Committee:—

Dr. A. HILL,
Dr. JOHN T. METCALF,
Dr. JAS. MCMANUS.

The following gentlemen were appointed as Delegates to the National Dental Association at Chicago, July 25th, 1865:—

Dr. W. W. SHEFFIELD, Dr. J. M. RIGGS, Dr. F. C. BUCKLAND,
Dr. E. E. CROFOOT, Dr. L. PARMLEE, Dr. A. HILL,
Dr. C. M. HOOKER, Dr. J. A. PELTON, Dr. S. L. GEER.

On motion of Dr. E. E. Crofoot, it was

Voted, That a Committee be appointed to revise Constitution nd By-laws, and report at next meeting.

Drs. E. E. CROFOOT, W. W. SHEFFIELD, and JOHN T. METCALF were appointed.

Dr. A. Hill called the attention of the Members to the manner of using HILL'S STOPPING, which was substantially as follows:—

Prepare the cavity to be stopped in the best possible manner. When this is done, and all things are in readiness, heat a small plate, or other piece of porcelain ware. This may be done by placing it upon a stove, or holding it for a few moments over the blaze of a spirit lamp. When thus heated, cut off enough of

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the compound to fill the cavity, press it for a moment upon the heated ware, and it will become plastic, and fit for immediate application. The cavity should be perfectly dry, and the Stopping applied as warm as the tooth will bear. Pack it with some blunt instrument, as firmly and rapidly as the case will allow, and rub down with a common burnisher, taking care to trim with a sharp instrument, the edge of the cavity. Should the material harden too rapidly, warm the point of the instrument in the blaze of a spirit lamp, and apply to the Stopping. This will mass it down and leave it perfectly tight and smooth.

Much care should be observed, that the compound be not burned in heating, as this would render it easily soluble in the mouth, and destroy its peculiar properties as a filling for teeth.

He distributed liberally to the Members, that they might test it in their practice.

Adjourned at half-past twelve, M.

NEW LONDON, October 3rd, 1865.

The Association called to order at a quarter to three, P. M. Dr. John T. Metcalf elected Chairman, *pro tem.* Minutes of last meeting read and approved. The following gentlemen were elected Active Members:—

Dr. W. W. CLAPP,	Norwich.
Dr. JAS. WOODMANSEE,	Norwich.
Dr. C. F. E. BLOOD,	New London.
Dr. J. H. ALEXANDER,	Mystic.
Dr. WM. H. SHARPE,	Putnam.

The following gentlemen were elected Honorary Members:—

Prof. J. H. MCQUILLEN, M. D., D. D. S.,	Philadelphia.
Dr. I. J. WETHERBEE,	Boston, Mass.
Dr. L. D. SHEPERD,	Salem, Mass.
Dr. F. SEARLE,	Springfield, Mass.
Dr. WM. B. HURD,	Williamsburg.
Dr. J. CHESEBROUGH,	Toledo, Ohio.
J. M. NEY,	Hartford.

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The President, Dr. A. Hill, in the Chair.
On motion of Dr. Sam'l Mallett, it was

Voted, That the regular order of business be suspended, and Dr. Wetherbee, of Boston, be allowed to present the claims of the Protective Union.

Dr. Sheffield presented Report of Committee on Revision of the Constitution, which was accepted. The Articles were read and unanimously adopted.

The consideration of the first subject presented by the Executive Committee:

TREATMENT OF IRREGULARITIES.

Dr. E. E. Crofoot, of Hartford, presented models of a case which he had been treating. Dr. L. D. Sheperd, of Salem, Mass., and Dr. H. L. Sage, of Bridgeport, also presented models, and detailed their mode of operating in such cases. Drs. H. L. Sage, Wetherbee, Sheffield, and Woolworth spoke at length on the subject. Dr. Atkinson spoke of the various causes that result in an irregular denture, and the means ordinarily taken to remedy such. In response to certain queries as to how certain cases should be treated, he remarked that it was impossible for any one, however extended his experience, or successful his practice in this direction might be, to decide upon what would be the best course to pursue in a complicated case, when his only acquaintance with the subject rested upon a description by another person. A rational and reliable opinion could only be given after a careful examination of the patient, or of accurate casts of the upper and lower teeth, showing their mode of articulation. With the exception of cases in which there may be vacant spaces posterior to the teeth, he said that it was impossible to move bicuspids and molars backwards.

Dr. McQuillen followed in a very clear manner, to illustrate the physiological laws governing the development and growth of the body. He directed attention particularly to the fact that the attainment of the normal size of the various parts of the organism was dependent largely upon the use that was made of them, or the amount of exercise they obtained, and expressed

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surprise that, although this was fully recognized by professional men, so far as other portions of the economy was concerned, it was singular that its application to the growth of the jaws was almost entirely overlooked. In the text books, and in communications in the Dental journals, writers constantly speak of the premature extraction of the deciduous teeth as objectionable on account of inducing contraction of the jaws and subsequent irregularity in the permanent teeth. He said that the irregularity was not so much attributable to contraction, as a failure on the part of the jaws to grow to the normal size, from the fact of not being sufficiently used. The absence of the deciduous teeth preventing due mastication of the food and proper exercise and growth of the jaws. In support of this position, reference was made to the large maxilla presented by savages, and those in civilized life, who live principally on coarse food which demands considerable chewing.

Adjourned at half-past six, P. M., to meet at the office of Drs. Sheffield and Brown, at half-past seven, P. M.

TUESDAY EVENING, half-past seven, P. M.

Met, according to adjournment, at the office of Drs. Sheffield and Brown, to examine microscopical specimens of bone and teeth, presented by Profs. J. H. McQuillen and Wm. H. Atkinson. As they both very kindly brought with them, for the benefit of the Members, powerful microscopes, all had ample time and opportunity to inspect them, and get clear and correct ideas of the structure of the teeth. The Professors were untiring in their efforts to explain the specimens, and all enjoyed the evening profitably.

At half-past nine, P. M., the Members adjourned to the residence of Dr. W. W. Sheffield, where they were entertained in a most hospitable manner. After partaking of the good things provided for them, Dr. Hill returned thanks on behalf of those present, and expressed his gratification at again being present with them. Alluding to the many advantages that the young

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practitioner had afforded him at the present day, in contrast with the difficulties which those older in the profession experienced, in their efforts for improvement. Dr. Atkinson, after alluding in glowing terms to the kindness of the host and hostess, dwelt particularly upon the importance of a thorough training preparatory to entering upon practice, and referred to the advantages attendant upon a course of collegiate instruction with intelligent and efficient private preceptorship, and very properly insisted that the day had arrived when the profession must take a decided stand in this matter.

Dr. McQuillen, in the course of some extended remarks, said that the truest and most efficient teachers were those who, beleiving that they had a mission to perform, merely regarded themselves, when surrounded by students, as learners standing among learners; a little in advance, it was true, and therefore prepared to assist and direct the efforts of beginners, but from the very fact of having made some progress in science, the more profoundly impressed with the vast field remaining to be explored and cultivated, and the utter impossibility of any single mind, however great, being able to grasp all.

Science rested upon a basis formed by the labors of innumerable minds for ages. Thousands upon thousands of patient observers had recorded fact upon fact, which a few great generalizing minds, capable of recognizing the exact relation which one fact bears to other facts, had arranged in that orderly and methodical manner which constitutes true science. As already remarked, this field was open to all, and one in which there was much still to discover and explain. It was a direction in which the Dental student should labor, and endeavor at least to add something to his own speciality.

God has vouchsafed to us five senses as avenues to the brain, and through these, according as they are properly used or not, we acquire knowledge from every source, and if animated by a just appreciation of duty, gladly and freely impart all that may have been gained to others. It has been truly said that man is first an apprentice, and then a workman, or first a scholar, and then a teacher, and then a discoverer; for when one essays to teach, he then really begins to learn, and often finds that much

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which he had accepted as true and reliable, would not bear the test of the sharp scrutiny of an earnest and mature mind.

Adjourned at half-past twelve, P. M.

NEW LONDON, October 4th, 1865.

Clinics were given by Dr. McQuillen and Dr. E. Strong, of New Haven, from eight to ten, A. M. Dr. McQuillen operated on the superior right, first molar, mesial and masticating surface, using sponge gold, and hand pressure.

Dr. Strong operated on the superior left, lateral incisor, restoring the shape of one-third of the tooth, with adhesive foil and with the mallet.

The attendance at the clinics was large, and all were pleased with the opportunity afforded by the gentlemen operating.

The Association was called to order by the President, Dr. Hill, at half-past ten, A. M.

The minutes of previous meeting read and approved.

On motion of Dr. Sheffield, it was

Voted, That a tax of three dollars be levied on all Active Members of the Association.

Prof. McQuillen proceeded to deliver a Lecture on the Microscopy of the Dental Tissues; illustrating it with a series of large, finely executed drawings of the microscopical appearance of the different parts of the Dental organs.

ADDRESS OF PROF. ATKINSON.

After the remarks of Prof. McQuillen, there seems to me to be nothing to say on the subject of which he has treated. We cannot be too careful in our examinations, or we may exemplify the old saying, "Fools rush boldly in where angels dare not tread." Because we cannot attain to the perfect demonstration of the why, and how, of being—because we cannot fathom the Infinite—we must not neglect the living spark of fire within us. A field has been presented to you this morning that should

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engage your attention. Notice how all new facts were first presented to us in the former history of Natural and Medical Science.

These Lacunae were first represented to be the bodies—"Corpuscles of Purkinge." Well, bodies they are in a certain sense, bodies of fluid in a solid medium. The Dental tubules were first represented as having proper walls, when they have none; the appearance being due to the refraction of light. The first duty of the student should be to know whether the appearance be an imperfection in the instrument, or of observation, or a veritable fact. He then entered the portals of an infinite field of study. Of the eight hundred millions of people upon our globe, we may count upon our fingers those who have investigated these regions. When we have arrived here, and not till then, we have attained to the first of the chain of links in the great theory of causation.

The whole law of nutrition is before you. You are in the border land, between spirit and matter, where each can claim the ascendency. Many things cannot be proved by direct demonstration. You have an idea, and it must be developed into a thought, and the thought into an opinion, and the opinion into a belief, and the belief into knowledge, or a principle. We are bound to investigate the origin of things, whatever it may be, and wherever our wildest imagination can carry us.

There is no lie but has some truth in it. When we arrive here, we are in the very border of the why, and the how. One of the most important departments in this region, is that of crystalization. We must be earnest, or we cannot succeed; but if we are enthused with the desire to know, nothing can hinder us.

My soul is all aglow with the thought, and the mind enters within the sacred portals of the "Temple of Science,"—truly so called,—in the light of whose presence, all the hows and whys of life and being seem plain as the simplest corelation of numbers. In this presence, each individual process, or problem, infinitessimally contains and foreshadows all possible form and function, in higher and more extended and complicated bodies and forms, ideal and actual.

Each of which is an exact repetition and amplification of that

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which had preceded it in microcosmic degree. Each mutation of which would be demonstrably plain to all, were it not for the rapidity and celerity with which the phases of mental labor are whisked past the tablet of perception, under the illumination of mental attention, produced by such surroundings as we here enjoy. We all desire to be appreciated. When we make a new discovery, we want sympathizing minds to communicate it to. This mental want knows no jealousy. We love those who love the things which we love. We do not even want sleep. We are traveling between spirit and matter, where first one and then the other, has the ascendency. We are in the first pronouncement of the planetary existences. Every body has to pass, in the beginning of things, from the fluid to the solid state. It is crystalization when we can demonstrate the crystals. Nutrition! what is it? It is simply the manufacture and decadence of cells. Every substance comes from the fluid to the solid state, and its solidity is just in proportion to the perfection of the expression of the crystalization.

You will often see in old teeth that the dentine is almost transparent, on account of its perfect consolidation. The contents of the cells are first saturated with limy matters, which are deposited around the walls, forming the hard parts, and the process goes on till the lime is all used up, when the impoverished material fills up the remaining spaces the "Lacunae and Canaliculi. When there is no more lime in it, it can no longer consolidate, by filling up these spaces. If you cut into a tooth, the instrument will stick as if you had pushed it into rubber. The oldest part of the enamel is in immediate contact with the coronal surface and the oldest part of the dentine; thus they diverge from each other in their formation.

Question. Is it not possible that the superincumbent tissue may have something to do with the nourishment of the tooth?

Prof. Atkinson. The action of these is absorptive, probably not convertible into tooth substance, only as they are broken down and carried into the general circulation as pabulum for any and all tissues, to whose vicinity they may be brought by the vessels that are the proper carriers of all elemental material, to be modeled by the type resident at the locality where tissue

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is formed. Hence, whatever they have to do is rather a negative than a positive duty.

In fact, there is too much involved in this question to admit of a complete and satisfactory reply, short of a long and well digested course of instruction to him, who is not himself capable of giving, or at least aphoristically memorizing such a course of fact and philosophy.

On motion of Dr. Smith, it was

Voted, That the Association tender a vote of thanks to Prof. J. H. McQuillen for his able Lecture, and to Prof. Wm. H. Atkinson for his remarks in continuation of the subject.

The President, Dr. Hill, expressed his gratification in listening to the able Lecture from Prof. McQuillen, and the remarks which followed, from Prof. Atkinson, and desired to testify to the zeal and liberality which had ever actuated these gentlemen in their efforts to impart to the profession all they had gained from study and experience, in a long and successful career of professional life. While he expected the Association to show, in a more substantial manner, their appreciation of those services. He also desired that the Association should express itself in the manner indicated by the motion of Dr. Smith.

The Recording Secretary announced to the Association the death of one of its original Members, Dr. Wilbur F. Knowles, of Middletown. He died August 15th, 1865. Dr. Knowles was a young man of much promise, and esteemed by a large circle of professional friends. He was a close student, a careful operator, strictly conscientious in all his business transactions, and a sincere Christian man. His death is a sad affliction to his relatives, and a loss to this Association and the profession.

Adjourned to two, P. M.

Association called to order by the President at two, P. M. Minutes of morning session read and approved.

Prof. Wm. H. Atkinson read a paper, entitled Death and Life and the Renewal of Life.

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Dr. James McManus read a paper on Filling Approximal Cavities.

Dr. Isaac Woolworth read a paper, entitled What causes Teeth to Decay.

Dr. L. D. Sheperd read a paper on Professional Education.

The discussion of the subject, Treatment of Teeth with exposed pulps, was opened by Prof. Atkinson, who said, in cases of simple exposure of healthy pulps, all that is necessary is to touch the pulp with creasote, secure it from pressure, and then fill it. I have advocated this treatment for years. A friend of mine, Dr. Allport, follows another method. He has a sharp instrument, and with a quick motion cuts it out. Then with another instrument, like a spud, peels off the pulp from the walls, and folds the lips together. He exhibited me three cases, they were all in good condition; two of them were only filled temporarily, but one of them had a permanent filling; but he was so kind and so positive about it, that he took it out and showed it to me. The pulp was perfectly healthy, without any trace of secondary dentine. The question resolves itself thus—Is not the tooth better with a living pulp, than with a foreign substance in it? I can save a tooth with extirpated pulp, but it is not the best way. You must be dexterous. You can do almost any thing, if you handle the instruments in the right way. You must work delicately; the love in your hearts must infuse itself into your hard instruments.

Perhaps you think me vague; but you may be thankful for this information. The best way to advance our knowledge is to detail our cases to each other, and not manufacture cases. But tell every thing fairly. If you do not quite succeed, say so, and do not try to make it out that you do, when you miserably fail. I had a case where half the body of the pulp was converted into secondary dentine. It was a bicuspid. I attempted to flake off a little piece to make a retaining point. Took rather a hoggish hold, and off came more than I intended, and out popped Mr. Red-head. I immediately touched it with creasote, and filled it successfully.

Here is a marvellous obedience of matter to the will of the operator; for three Dentists present advised devitalization. It

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remains well. Success depends on the earnestness of our heart's best affections.

We have one of the holiest instances of the power of the will, in the world. "I will, be thou clean," pronounced by Him, "who spake as man never spake;" when he left us the blessed encouragement of "greater things than these shall ye do, if ye be followers of that which is good"—to somebody else than a grovelling self-hood. The moral state, the good intent, is the measure of success—clean, joyous, and abiding.

Dr. Sheffield's experience differed from Prof. Atkinson's. As a general rule, he favored extirpation; for after the tooth was well filled, as he might suppose, the chances were that presently there would be an alveolar abscess. He had had many such cases, when the teeth had been filled by other Dentists, and he presumed that others had similar experience. Often the abscess would not appear for a year or two. Instead of creasote, used Tinct. Calendula.

Prof. Atkinson said, every one must sail his own ship. He must first be competent and prepared to meet exigencies, and then use his judgment. A tooth may ache and suppurate, and yet be saved, if there is compatibility between the operator and patient.

Dr. Hurd said he always took the liberty of differing from Dr. Atkinson whenever he wished, and believed the Doctor liked him the better for it. This idea of compatibility, in his mind, was nonsense; otherwise thought it would be a good idea to fill with compatibility altogether. He was glad to see the Conecticut Dentists in Association, and cautioned the Members to avoid all party cliques, and be united, for the advancement of the Association and the interest of the profession. He gave a brief history of the formation of the New York Society, and the causes which led to the organization of its vigorous rival, the Brooklyn Association. These Associations were powerful agents for good, when properly supported, and all should take an active part in their Transactions.

Adjourned at five, P. M.

JAS. MCMANUS, *Rec. Secretary.*

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CONSTITUTION AND BY-LAWS

OF THE

CONNECTICUT STATE DENTAL ASSOCIATION.

ARTICLE I.—NAME.

This organization shall be known by the name of THE CONNECTICUT STATE DENTAL ASSOCIATION.

ARTICLE II.—OBJECTS.

The objects of this Association shall be to cultivate the Science and Art of Dentistry, and all its collateral branches. To elevate and sustain the professional character of its Members, and to promote among them mutual improvement, social intercourse, and good feeling.

ARTICLE III.—MEMBERS.

SEC. 1st. The Active Members of this Association shall be exclusively practitioners of Dentistry, residing within the State.

SEC. 2nd. New Members may be proposed by any Active Member, at any stated meeting, and if seconded, may be balloted for at said meeting, and if approved by a two-thirds vote of the Members present, the candidate shall be received, on paying the sum of three dollars, and signing the Constitution and By-laws of this Association.

SEC. 3rd. Dentists, or others, who have contributed to the advancement of the profession, may be elected Honorary Mem-

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bers, but shall be entitled to no voice in the management of the Association; and Active Members shall become Honorary Members on their removal from the State.

Article IV.—Meetings.

The regular meetings of the Association shall be held annually, commencing on the third Tuesday in May, alternately at the Cities of Hartford and New Haven; and there shall be a semi-annual meeting, at such time and place as shall be agreed upon at the preceding regular meeting.

Article V.—Officers.

Sec. 1st. The Officers of this Association shall consist of President, Vice President, Corresponding Secretary, Recording Secretary, Treasurer, and Librarian.

Sec. 2nd. The President shall preside at the meetings, and perform all the duties that parliamentary rules may require.

Sec. 3rd. The Vice President, in the absence of the President, shall assume all the duties of that Office, and in the absence of this Officer, a Chairman *pro tem.* shall be appointed *viva voce.*

Sec. 4th. The Corresponding Secretary shall attend to the correspondence with the Association, and give due notice of the meetings.

Sec. 5th. The Recording Secretary shall keep accurate minutes of the proceedings of the Association, preserve the archives, and attend to all other duties that appertain to the office.

Article VI.—Committees.

An Executive Committee, composed of three Members, shall be organized each year, to carry into effect the orders of the Association. They shall be required to procure suitable accommodations for the meetings, to select and announce, at the earliest practicable period, after their appointment, subjects for discussion at the succeeding meeting, and shall be authorized to employ a competent reporter to furnish an accurate report of the proceedings.

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Article VII.—Amendments.

These Articles may be altered and amended, with the consent of three-fourths of the Members present, at the subsequent meeting to that at which such alteration or amendment may have been proposed.

Article VIII.—Order of Business.

The order of business, at the annual meetings, except when for a time suspended by a vote of three-fourths of the Members present, shall be as follows:—

1st. The Calling of the Roll.
2nd. The Reading of the Minutes.
3rd. The Election of Officers.
4th. The Report of Committees.
5th. The Election of Members.
6th. The Reading of Essays.
7th. The Discussion of Topics selected for the Session.
8th. The Appointment of Committees.
9th. Miscellaneous business.
10th. Adjournment.

BY-LAWS.

Article I.—President.

The President shall preside at the meetings, keep order, state and put questions, regulate debates, and sign all orders on the Treasurer, passed by the Association. He shall not, while in the Chair, discuss any question, except it be a question of order. He shall not vote, except in the ballot for Officers, unless his vote is necessary to decide a question upon a call of the yeas and nays.

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ARTICLE II.—MEMBERS.

No person shall be considered a Member of this Association until he shall have signed the Constitution and paid the initiation fee.

ARTICLE III.—CONDUCT.

Any act of special immorality, or unprofessional conduct, committed by a Member, shall be referred to a Committee of three, who shall examine into the case, and, if the charges be sustained, report at the next annual meeting, whereupon, by a vote of two-thirds, the offending Member may be reprimanded or expelled.

ARTICLE IV.—DEBATES.

No Member shall be permitted to address the Chair more than twice upon the same subject, nor shall he consume more than fifteen minutes, unless by consent of the meeting.

OFFICERS.

Dr. A. HILL, Norwalk, *President.*
Dr. W. W. SHEFFIELD, New London, *Vice President.*
Dr. JAS. MCMANUS, Hartford, *Recording Secretary.*
Dr. LEROY D. PELTON, Hartford, *Correspon'g Secretary.*
Dr. E. E. CROFOOT, Hartford, *Treasurer.*
Dr. CHAS. P. GRAHAM, Middletown, *Librarian.*

Executive Committee.

Dr. SAM'L MALLETT, New Haven.
Dr. JOHN T. METCALF, "
Dr. H. J. STEVENS, "

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Publishing Committee.

Dr. A. HILL, Norwalk.
Dr. JOHN T. METCALF, New Haven.
Dr. JAS. MCMANUS, Hartford.

List of Members, October 20th, 1864.

Dr. E. E. CROFOOT, Hartford.
Dr. J. M. RIGGS, "
Dr. C. M. HOOKER, "
Dr. JAS. MCMANUS, "
Dr. L. PARMLEE, "
Dr. WM. M. PORTER, "
Dr. WM. BLATCHLEY, "
Dr. SAM'L L. G. CRANE, "
Dr. LEROY D. PELTON, "
Dr. DAN'L DWYER, "
Dr. JOHN A. KELLY, "
Dr. C. BULLOCK, "
Dr. JOSEPH H. SMITH, New Haven.
Dr. JOHN T. METCALF, "
Dr. H. J. STEVENS, "
Dr. ISAAC WOOLWORTH, "
Dr. SAM'L MALLETT, "
Dr. J. H. REED, "
Dr. C. LONGSTREET SMITH, "
Dr. ELIAS STRONG, "
Dr. W. W. SHEFFIELD, New London.
Dr. R. W. BROWNE, "
Dr. WM. ALLENDER, "
Dr. S. L. GEER, Norwich.
Dr. J. A. PELTON, Middletown.
Dr. CHAS. P. GRAHAM, "
Dr. WM. H. DIBBLE, "
Dr. A. HILL, Norwalk.
Dr. JAS. G. BARBOUR, Norwalk.
Dr. F. C. BUCKLAND, Manchester.
Dr. R. B. CURTISS, Winsted.
Dr. S. S. FULLER, West Granby.

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Dr. H. L. SAGE, Bridgeport.
Dr. GEO. H. Waters, Waterbury.
Dr. F. T. MERCER, Mystic.
Dr. E. T. PAYNE, Stamford.
Dr. R. C. DUNHAM, New Britain.
Dr. JAS. O. FITCH, Willimantic.

Members, May 16th, 1865.

Dr. T. S. SCRANTON, Madison.
Dr. G. B. BOUTWELL, Ansonia.
Dr. A. E. STRONG, New Haven.
Dr. G. A. GRACE, Meriden.
Dr. H. D. SYDLEMAN, Norwich.
Dr. JOHN CODY, Hartford.

Members, October 3rd, 1865.

Dr. C. F. E. BLOOD, New London.
Dr. W. H. SHARPE, Putnam.
Dr. J. H. ALEXANDER, Mystic.
Dr. W. W. CLAPP, Norwich.
Dr. JAS. WOODMANSEE, Norwich.

Honorary Members.

JAS. H. ASHMEAD, Esq., Hartford, October 20th, 1864.
WM. H. ATKINSON, M. D., D. D. S., New York, May 16th, 1865.
Dr. C. E. FRANCIS, " " "
Dr. CHAS. W. BALLARD, " " "
Dr. GEO. A. MILLS, Brooklyn, " "
Dr. H. M. MILLER, Westfield, Mass., " "
J. H. McQUILLEN, M. D., D. D. S., Philadelphia, Oct. 3rd, 1865.
Dr. L. J. WETHERBEE, Boston, Mass., " "
Dr. L. D. SHEPERD, Salem, Mass., " "
Dr. F. SEARLE, Springfield, Mass., " "
Dr. WM. B. HURD, Williamsburg, N. Y., " "
Dr. J. CHESEBROUGH, Toledo, Ohio, " "
J. M. NEY, Esq., Hartford, Conn., " "

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THE PAST, PRESENT, AND FUTURE OF DENTISTRY.

BY DR. ISAAC WOOLWORTH.

[Read May 16th, 1865.]

Mr. President and Gentlemen of the Connecticut State Dental Association:—There is a trite saying, which has passed into a proverb, that necessity is the mother of invention. It is also true, that every thing among men has had a beginning. It might be difficult, if desirable, to point you to the first man who conceived the idea, which has resulted in the profession, for whose advancement and perfection we are gathered here to-day. To tell where he was born, what laurels he won, or where he died. Yet it would be most reasonable to suppose, that the practice of examining the teeth, which had become the seat of a mysterious and anomalous pain, and the endeavor to comfort them, must have originated in some urgent want. And I have no doubt that this strange phenomenon must have been regarded as a sore affliction, and might have been supposed to have had its origin with the devil. For the inimitable Scottish bard has since characterized it, in one of his poems, as the "hell of all diseases."

Now, it is in perfect keeping with the instincts and habits of man to search out, and endeavor to remove or exterminate, all mortal enemies to his peace or welfare. Hence, it is quite reasonable to conclude, that both his ingenuity and reason began early though feebly to operate against the cause of this supreme annoyance—this insidious foe to his peace. There are some scintillations of evidence that attempts were quite early made at stopping those singular holes on the grinding surfaces of teeth, how successfully we are not informed. There is, however, abundant evidence that numerous attempts have more recently been made at plugging teeth, as most of us can testify, with very dubious results.

From a very early period there is evidence that both lead and gold have been employed, and were, until a very recent date, the only substances used in filling teeth. It is said, however,

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that the Chinese, centuries ago, possessed a method, now lost, of filling teeth with a substance resembling enamel in color and texture; but of this, almost nothing is known. If it was no better, as a permanent stopping, than its modern cousin, os artificiel, or bone filling, the world will not crucify itself for its loss. Gold, from its superior hardness and costliness, was not so much employed, in the earlier and ruder stages of our art, as lead. This substance, according to Dr. John Hunter, who wrote in 1778, was more, and almost the only substance employed at that time, and down to 1833, for this purpose.

In treating the subject which I have chosen for this occasion, in the order of its title, I am compelled to adopt the course of the country parson—in treating the first part of it at least—who took for his text: "The world, the flesh, and the devil." In the division of his subject, under its three natural heads, he said he should pass over the world, touch lightly upon the flesh, and hasten on to the devil. So I, for reasons which you will all appreciate, am compelled to pass over the past history of Dentisrty, nearly all of which is familiar to most of us, shake up the present as little as I may be able, and sail into the future. It might, however, be a little refreshing to the older Members present, and a little consoling to some of the younger ones, to advert in passing to some of the early struggles and difficulties which attended the pioneers in our noble art, as they groped their way along the untried paths which we were obliged to travel.

And I do most heartily congratulate my young brothers, who enter our ranks under the greatly improved facilities of the present, that they have not to struggle against those formidable discouragements which met us at every step. And if the facilities for acquiring a knowledge of Dentistry were not greatly increased during the last twenty-five years, I would advise all aspirants to the honors and trials of our profession, to file saws, or fill bomshells, rather than teeth, to practice on harrow teeth, or rake teeth, rather than human, lest their sins of ignorance, the difficulties, and the frightful havoc which they would inevitably make of those gems intrusted to their care, would rise up and overwhelm them. For surely, with such a record of the past—as several years of my early endeavors within easy reach

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of my memory furnish—I should blush to stand before you and claim a decent career as a Dentist, were it not for the consciousness, not altogether satisfactory, that I did what I could. A most charitable writer has said that he who does the best his circumstances allow, does well, acts nobly, angels can do no more. Many of you, gentlemen, may never know, and I sincerely hope you may never experience those difficulties under which we labored, who once at least stood in the front ranks of our profession.

Our worthy President, and those of us whose experience dates back twenty-five or thirty years, can easily recall many performances, for which we would gladly atone, by many years of more useful labors. And this, gentlemen, is the only way in which we can now atone for the past and acquit our consciences before their own tribunal. One of the greatest obstacles in our way, in those early times, was the utter dearth of instruction in the special requirements of our profession. We had no special literature, very few text-books, no colleges, no public instructors; and one might as well interrogate a Hottentot, as to ask questions of a Dentist with the hope of gaining instruction—so that the experience of others was of no commercial or interchangeable value whatever. I remember well calling on a Dentist, in the Summer of 1838, well known for his imperious self-conceit, but whose operations had attracted my attention, and awakened in me a commendable desire to see, if I might see, and to hear, if peradventure I might hear, something to my advantage. I was treated with much politeness and courtesy, so long as he supposed me a patient. But about the same time he discovered his mistake, I discovered mine, and retired, disgusted and chilled, at his icy selfishness, perhaps a wiser man, but no better Dentist.

But thanks to the progressive genius of our art, those days of darkness and selfishness have, we may fondly hope, forever disappeared, and our noble art, under the fertilizing light of experimental knowledge, and the genial influence of a more liberal spirit, claims to-day the dignity of a demonstrated science. The Dentist of to-day, is not the itinerant tinker who might have been seen a few years ago, prowling about the country, with a mysterious little box under his arm, containing a few old

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awls, a few crooked irons, a few leaves of tin foil, and a little nub of sea-horse tooth, fixing teeth. He is a gentleman of kind and genial manners, of good education, in fair and honorable competition with the other learned professions, appreciated and patronized by an intelligent and generous public. Instead of being a superfluity among men, he is now the indispensable need of every community. And then, too, compare some of his delicate operations and beautiful structures of the present with some which all of us have met, if not actually *perpetrated*, in our lives, and see and admire the contrast. Instead of the ivory *shuck* carved out and mounted with teeth of animal origin, actually inhabited from very filthiness and decomposition, to supply the loss of an entire upper or under set of teeth, look to-day at those beautiful triumphs of mechanical Dentistry, those splendid mineral teeth, mounted on imperishable platina with continuous gums, the very rival of nature, and those on vulcanized rubber, less beautiful, perhaps, but durable, and worn with great ease and comfort. And then, too, just examine some of those golden gems, golden corners, golden halves, and even golden crowns of teeth, put in and put on, yea, and hammered together as solid as the smelted metal itself, (with a good Atkinson plugger,) and compare those performances, the astonishment and delighted wonder of even the performer himself, with some of those musty and dingy stuffings, which some of us may have seen, and which we hoped might last—at least, till the patient had paid his bill and gone.

Look, I say, my brethren, on these pictures, not overdrawn, of the past and present of our profession, and rejoice with me that a brighter day dawns, yea, even shines in all departments of our chosen profession. Let us thank God and take courage, that we are permitted to practice in so noble a calling as ours, in this year of grace and of glory, 1865. The past of Dentistry has had its uses as well. Had there been no past or point of beginning and departure, there could be no present or point of progress. Had not FULTON built his first rude little steamer, the very derision of his time, which could make the round trip between New York and Albany in a week, there had been no VANDERBILT, the steamboat king, whose floating palaces can swim the Atlantic in the same time, and traverse to-day the

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navigable waters of the globe. So, had not some men conceived the ideas, ever so rudely, and held them with a tenacity we are compelled to honor, Dentistry, in the vigorous and heathful manhood, which we behold it to-day, must have perished still-born.

A prophet of the nineteenth century might have predicted of Dentistry, as a valued and honorable profession, as did one of old of a famous and mighty people. "Though thy beginnings be small, yet shall thy latter end greatly increase." The little cloud, no larger than a man's hand, seen floating in the clear sky toward the land of Palestine—parched with drought by the space of three years and six months—continued to spread until it covered the whole land, descending in grateful showers to refresh and fructify the earth, and gladden the heart of the disconsolate watcher; so, the feeble thought of some humble man, working toward his finger ends, in the interest and behoof of the human family, suffering, perhaps, untold horrors for centuries, was the root and origin of one of the greatest blessings to our race, which has been gathering strength and contributions from the thoughts and labors of other minds and other hands, during at least the last half century, till to-day the accomplished Dentist is one of the most useful and skillful men in the world. Like the little rill which percolates from under some moss-covered rock on the far-off eastern slopes of the Rocky Mountains, which an infant's hand might cover, or an infant's foot obstruct, commences its downward course to the sea, receiving contributions and volume, as it meanders along the rock-bound ravines, and through the fertile prairies of the great North-west, obstructed by no barrier, until the mighty Missouri pours its eddying floods into the great Father of Waters, which has so proudly borne upon its broad bosom whole fleets of our splendid navy of monitors and iron-clads, at once the strength and defense of *our* nation, the significant *terror* and wholesome caution to every belligerent power on the globe.

So Dentistry, from the smallest possible beginnings, with its little rush-light of literature, flickering and dim, with its few bungling and blundering practitioners, unknown and unheard of by each other, has gone steadily and rapidly on, multiplying in numbers, and growing in grace and accomplishment, increas-

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ing in favor with every earnest laborer in the great field of actual development, and with the cultivated and appreciative men and women in all lands, until the horizon of its usefulness and labors are to-day co-extensive with the cultivated and civilized portions of the earth. We have now in the interest of our profession several respectable colleges, each with a corps of learned professors, which will compare favorably with the celebrated medical schools in our cities, where clinical instruction is given. We have also periodicals, monthlies, and quarterlies, which bring to the office of every Dentist who desires them, the fresh productions and latest developments of a great army of devoted men, who are laboring with commendable zeal to develop the resources of a young and thrifty profession, destined to stand in the front ranks of the most beneficent institutions among men.

Having briefly adverted to the past, by way of contrast and argument, spoken of the present a little for our edification and encouragement, it remains to me to consider the future prospects of our profession in the light of the past and of the present, and our relations and duties in its development. First, then, what are the needs in this direction, as seen from our present standpoint? One of the first, as it seems to me, is the want of published and oral instruction among the people, nearly all of whom have an interest with us in the immediate future of Dentistry. The cause of this want may be found in the fact that Dentists, for the most part, are practical men, and not theorists or writers; many of them, perhaps, deficient in the literature of their profession, and general literature as well. And our writers and lecturers, physicians, and physiologists, who contribute so copiously to the amount of intelligence among the people on almost every other useful art or science, are altogether silent on this, involving the comfort or convenience of almost every individual in civilized life. Who ever sees or reads an article or paragraph on the teeth? The public press is teeming with instruction, and popular lectures are read on all subjects of interest to the people, many of them of far less importance than those pertaining to teeth.

I am aware that it is expected that every specialty in the useful arts or sciences will furnish its own quota of instruction

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on matters peculiarly its own. I am also aware that Dentists have not sought to enlighten the people, by furnishing instruction in their special department, who, of all others, should be best qualified to do so. It is not because they have not a literature of their own, nor is it because they have not able and efficient practitioners and writers in their favorite profession, who might find both profit and fame by an outspoken and generous promulgation of that knowledge which they alone possess, not of processes and manipulations peculiar to their practice, of value only to themselves, but of the causes of disease, and means of preservation of those beautiful gems, more precious than rubies, which experience has taught them are not well understood by the people. Such a course would in time give us intelligent patrons who would know what we can do for them, and when to ask our assistance. I cheerfully acknowledge my own remissness in this duty, as well as my own inability to do justice to a subject of sufficient importance to enlist the energies of the best of writers, to give to it that demonstration which it justly deserves.

I have no more doubt that as greatly an improved condition of the teeth of this generation may be realized by the diffusion and practice of correct doctrines as in any thing else. There is no single interest in our country of one-tenth the importance to every human body, that has not called to its aid the scientific, scholastic, and literary energies of our times. Agriculture, which, until recently, was permitted to jog along the beaten track of centuries, without an advance-guard even, is now calling to its aid the most erudite professors, teachers, and writers, together with an experimental host of practical men who are now giving to the oldest pursuit of our race, the dignity of a modern science. And yet no voice is heard, no pen is made to speak to the popular ear or understanding, on the means of preserving the teeth. All that meets the public eye, or ear, is the flaming card of some new-fledged "Surgeon Dentist," with the unmistakable odor of a previous business fresh on his garments, and who now offers his valuable services to the public very cheap for cash, etc., etc.

The most attractive thing he would have you notice, is the cheapness of his wares. Who ever heard of a skillful man offer-

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ing his services at a discount? Can you buy superfine flour, or cloth, below the market value of such articles? The surest evidence usually of the quality of a man's services, is the value which he attaches to them. Fifty cents will buy a fifty cent man, even for a witness; but a man who is worth a dollar, will not be found in market in competition with him. There is magic in this word cheap, aye, and deception too; and the cheat is, that some think they are getting a first-rate article at a second or third rate price. Now, I am not an advocate for a high tariff of prices, which the rich only can pay. But I am in favor of good work at remunerative prices. I have often seen teeth filled with gold, ranging from fifty cents to five dollars, and even thirty dollars; yet I never saw a fifty or seventy-five cent filling that was worth the money paid for it. Not because three, five, or thirty dollars, must necessarily be paid for every perfect plug! but because no Dentist, who is capable of making a good plug, will condescend to work at those low rates which are not the price of good work anywhere. I may here be asked, Can one man afford to fill a tooth for fifty, or seventy-five cents, or even a dollar, while another must be paid three, five, or thirty dollars for the same thing? I answer that double, treble, and even ten or twenty times as much time and material will be employed in the one case as in the other, to say nothing of skill, the invariable compound of genius, industry, and experience—and, I may add, of conscience.

I have dwelt thus much upon remuneration in our profession because of the great diversity of prices and quality, and because excellence is the sheet-anchor of the Dentist's profession—the great field in which the skillful operator can demonstrate the positive power of our art, to benefit his fellow-men, and to bear us onward to that triumphant future which we anticipate. The unremunerative prices for which such services have been attempted, is the grand reason why so many valuable teeth have been sacrificed.

There is another subject to which I wish to call your attention, gentlemen. I do not speak of it so much as a neglect—for I do not know how culpable others may be in this particular—as I do for its agency in the future of our profession, and for its effect on the teeth of the present and coming generations in this

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country. That is our personal intercourse with our patients. There is much we can do, if we will, besides operations and structures, to benefit those who seek assistance at our hands. In our office intercourse with those for whom we operate, we can drop a word, or make a suggestion, or prescribe directly, and urge our prescriptions upon the notice of our patients. This can be done in such a manner as to secure a grateful appreciation of those unselfish and unpaid services.

It is said that "words fitly spoken, are as apples of gold in pictures of silver." How truthfully will this beautiful proverb apply to every Dentist who earnestly seeks the best good of his patients, and the advancement of our calling above a mere trade. Speak to the young of the importance of punctual attention to their teeth; encourage in them habits of cleanliness with respect to the safety of those organs from decay. Speak to them of the great detriment, and sure destruction of their teeth, arising from the habit of tasting food and other delicious morsels at all hours of the day, when their systems have no need of nutriment. Tell them that solid and nutritious food is preferable to a thin and watery diet, that teeth are made to eat with—and that all food in a semi-fluid state which can be swallowed without mastication and thorough insalivation, deprives the teeth of their proper use, and the stomach of a very important auxiliary to complete digestion. Call the attention early of mothers to their children's teeth. And oh, how early, gentlemen, when it is perfectly understood by every intelligent Dentist, and should be known by every married pair, that the foundation of every perfect set of teeth *must* be laid months before their children are born! Be not startled, gentlemen, at this announcement, and this survey of the field of our duties, for the mission of our profession, in its future triumphs over the atrophied and decaying teeth of the American people, unmistakably and imperatively demands of us that we take cognizance of them, even in the children who are to *be* born.

A beautiful illustration of this doctrine was given to the profession by Dr. Watt, of Zenia, Ohio, at the American Dental Convention, which met at Saratoga, N. Y., in August, 1863, of a family, of mother and children, whose Dentist he was. The mother was one of those delicate ladies, like many American

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wives; her first-born was a daughter, who inherited her mother's physique, and slight bony structure, who lost her teeth, and was supplied with artificials at the age of fourteen years; the next two were sons, at two subsequent births. The mother, by the advice of Dr. Watt, took in considerable quantities of phosphate of lime with her food, and otherwise, during the entire period of utero-gestation, which resulted in giving to that mother two charming boys, each weighing at birth over thirteen pounds, who grew in stature and comeliness, and developed at twelve or thirteen years, said the Doctor, the finest sets of teeth he had ever seen. This mother had other children afterward, but neglecting the phosphates, they resembled their sister in the particulars above named. This, to be sure, was a single instance, but it is a fact of great significance in proof of the doctrine just advanced, and which I regard as fundamental of all others in securing that renovated condition of the teeth of our countrymen, which it is the province and in the power of our profession to accomplish.

We have other duties and powers, gentlemen, than simply to repair the ravages of decay, and to supply the losses occasioned by this Dental atrophy, to which allusion has been made. To us belong the duties, and we have the facilities increasing every day, of giving to the vast millions who are now living, and are yet to live in this country, and the world, the greatest of physical blessings—a sound and durable set of natural teeth.

We have already given to Surgery, and the world, the most reliable solace in the hour of fiercest physical agony, which all scientific history furnishes—the practical application of all anæsthetics to prevent pain, the credit of which belongs, of right, to the late Dr. Horace Wells, a Dentist of Hartford. Am I extravagant in my hopes, or whimsical in my fancies, when I look with earnest expectation from our present high position, at the long and rapid strides which this young giant is making in the mere babyhood of its history, that I seem to see in its full development, a rainbow of promise, such as never spanned the heavens over the pathway of any art or profession among men? Is this a wild chimera, a boastful splurge over an insignificant handicraft of a few *loafers*, too lazy to earn a living in an honest

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way? Or do I really discern before me an honest and earnest phalanx of live men who are bound to push their inquiries and labors in the right direction toward an honorable and lawful distinction in our eminetly proper and laudable calling! the stimulus of whose zeal is not so much to pocket a few dollars by a temporizing policy, ending with each day, but a manly forecast toward a beneficent and brilliant future which will do ample justice to the best endeavors of the best of men?

But to accomplish any thing in this direction, it is imcumbent that thé Dentist be thoroughly competent to advise, and in other respects worthy of confidence in the most delicate sanctities of the nursery. He must not only be a careful physiologist, but he must possess a pure and exalted philanthropy, ready to impart the knowledge he may possess, without fee or reward, to persons wholly unknown. His motives must be pure and unselfish. He must be gentle in manner, devoid of all insincerity, having a clean conscience, zealous, of noble and philanthropic works, which are performed with a single eye to the generations who are to come after him. This is just the hinge on which all our hopes of the future of Dentistry turn, and which I have endeavored to keep prominent in this discourse as the object of my humble efforts at this time.

Let us not for a moment have fear that, as the great rebellion being over, our great army of officers, musicians, and privates, will have nothing to do but in the pursuits of peace. *Our war* is not over yet, it is just begun. Instead of foreshadowing a cessation of hostilities, I have only suggested a new campaign. And *we* have enlisted for the war, and our already excellent commissiarat must furnish us better supplies in future, and we must go on from conquering to conquer, until all our enemies, including all exclusives and non-fraternizing Dentists, the swamp angels of our profession, are "*hors du combat*," and the work of reconstruction is complete.

Now, then, I repeat, that if all Dentists were true representative men, zealous to achieve the best possible development of our profession, by a scrupulous fidelity to its future triumphs; and if all mothers would wisely and early co-operate with us in our efforts for the permanent comfort of their children in this regard; and if all young persons, whom the Great Architect has

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supplied with His own inimitable dentures, would follow the advice of the poetical Dentist, Solymon Brown—

> Whene'er along the ivory disks are seen
> The filthy footsteps of the dark gangrene,
> When caries comes, with stealthy pace to throw
> Corrosive ink-spots on that bank of snow,
> Brook no delay, ye trembling, suffering fair,
> But fly for refuge to the Dentist's care.
> His practiced hand, obedient to his will,
> Employs the slender file with nicest skill;
> Just sweeps the germin of disease away,
> And stops the further progress of decay.

And when cavities exist—why then let Dr. Brown proceed.

> The practiced Dental-surgeon learns to fill
> Each morbid cavity, by caries made,
> With pliant gold. When thus the parts decayed
> Are well supplied, corrosion forced to yield
> To conquering art, the long-contested field,
> Resigns his victim to the smiles of peace,
> And all decay and irritation cease.

Then may we reasonably anticipate a day not very remote, when artificial substitutes for good natural teeth will scarcely be known, except in history, or be found in the cabinets of the curious, or among the buried fossils of a past generation. I am neither a prophet, nor the son of a prophet, but from the observations I have been able to make during the last thirty years of the achievements of our profession, and the diffusion of sound physiological doctrines, I can as distinctly see the coming of that day, as that the future has hope or promise of improvement in any reformatory measures whatever.

Come, then, gentlemen of the Dental profession, let us wisely consider the part we are to act in bringing to pass that happy era. Let us be faithful in the use of the means we already possess, and vigilant in the pursuit of more and better appliances. To inaugurate that day of complete success to our labors, let us study the tactics, and search the haunts of these insidious foes to personal comfort—Dental caries and toothache—until we can drive them from their lurking-places between the teeth, and from

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their bolder positions on the crowns, and in the front ranks of those ivory sentinels, so firmly stationed to guard the portals of nutrition, to minister to the perfection of speech and of song, to the beauty and grace of every smile.

PATIENCE IN DENTISTRY.

BY DR. SAMUEL MALLETT.

[Read May 16, 1865.]

On the physiological and phrenological principles, that the activity of any organ of the body, or faculty of the mind, increases its power and size, the Dentist may, in view of a most valuable virtue, be considered a very fortunate man, for probably it may be said with truth, that no profession, or occupation, furnishes a more favorable field for the exercise of Patience, and none indeed is more exacting in this direction, than the Dental profession.

It cannot be expected in an essay of this kind, to even hint at the thousand and one annoyances, which go to make up the constant and vast burden of pressure which crushes, and finally breaks down and destroys the body, if not the mind, of the Dentist for future activities.

Job was tried as no man ever before was tried, but this was before people became nervous, or, at least, before it became fashionable to be nervous, and before the days of Dentistry. If Job had been a Dentist, we cannot say how he would have come out of his fiery ordeal. I can only name a few sources from whence these disturbances come, and perhaps give an example under each.

1st. *Patience with the Patients.*—One of the first and most prominent annoyances which the Dentist encounters from his patients, is their want of *punctuality;* and while they would think it a rude thing, if he should not be found in his office at the hour named, ready to perform the requisite service, *they* can break *their* engagement with the utmost coolness, giving the

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most frivolous reason for their want of punctuality. One will offer as an excuse for wasting an hour of the Dentist's time, when the days are short, and only about six hours are allowed for operations in the whole day, that "friends were met, and they wished to have a little *time with them.*" Another, with all assurance that every thing stands aside for *her*, when *she* comes, gives no reason for being tardy, and that, too, when every hour of the day, and more is needed to meet the demands which are made upon the Dentist.

The Dentist has a very busy day before him, every hour is provided for, and no margin has been left for unexpected calls; he is earnestly engaged in filling a difficult tooth, when the door bell rings, and a lady with a child, five or six years of age, is ushered into the reception-room. She has brought the little girl to have a tooth extracted. She is bidden to take a seat, and at the earliest opportunity she shall be attended to. As soon as the present operation will admit, the patient is requested to excuse the chair for a moment, that he may attend to relieving the little sufferer from pain. The child is in the chair, and the mother, more childish than the child, as if to frighten the timid little one, goes away to another room—she is too delicate and sympathetic to see her child hurt. The little patient is frightened, and hestitates about having the operation performed, however simple and harmless it is. The kind Dentist endeavors to persuade, and by all the arts and means, of which he is master, makes an effort to secure an opportunity to remove the aching tooth, until a half hour has been spent, not only of his own time, but as much more of the time of his regular sitter, for which he can render no return. Seeing no prospect of success, he ventures to say to the lady that he cannot spend any more time now, but when she is ready to have the tooth out, at any momoment, he will do it. She leaves with the child, and not long after returns, saying the child is now ready; seated in the chair, the same routine of coaxing and loss of time is gone through with, as before; the Dentist is beginning to loose his equanimity, when he remarks, "it will not do for me to trespass more on the time of others, I can take out the tooth instantly, if I can be allowed to do so." The mother leaves again with her charge, half a mind to blame the Dentist for not succeeding!—at any

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rate, she goes out looking very ill humored,—the operator not knowing whether it is with himself, or at the failure; he has not more than congratulated himself with having escaped from a great annoyance, when the same person appears before him again. Now a thought of strategy rushes across the Dentist's brain. He seats the child on a stool, under the pretence of looking at the offender again, but the little frightened sufferer suspects some design upon her; she wrings, twists, and screams, as if for her life. The Dentist has "risen in his might," holding with all his power, he succeeds in extracting the *loose milk tooth.* The mother is horrified that such an undignified, and even barbarous course should be pursued with her child, and with considerable spirit demands "What is to pay?" "Fifty cents madam." "Why, I thought you did not charge but *half-price for children's teeth.* Dr. Q. pulls children's teeth for twelve and a half cents."

The Dentist is also required to exercise patience with the *friends* of the patients. One, has a friend who has been endeavoring to persuade her to employ *her* Dentist instead of ourself. She has exhausted her powers in traducing us, and setting forth in exalted terms, the skill and virtues of the gentleman she employs. *He* is a man after her own heart, and how insignificant are we in comparison; however, no entreaties will dissuade our patient from continuing our services, we have gone on using our utmost skill in constructing and inserting a set of teeth,—have thought we succeeded very well,—our patient is also pleased,—her friends at home are satisfied, but her officious friend, who was so thwarted in her schemes before, is determined now to have her revenge. She no sooner beholds our patient, than she accosts her thus:—"O, you have got your teeth, have'nt you? How horribly they look! How they *pout your lips out!* I should'nt have known you. I would'nt wear such teeth. I would'nt be seen with them in my mouth. I would make Dr. ——— make them over. Have you paid for them? If you have not, you had better go with me now, to Dr. A.'s, and get some you can wear."

The result is, we have an opportunity to make over a set of teeth which were well enough before.

Not a small amount of patience is needed with Dentists, and

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the friends of the Dentists. What difficulties have been experienced in former years, in endeavoring to associate the profession, and considerable of the same spirit is exhibited in certain localities in the present day.

One stilted, professional man, gives various reasons for declining to associate, when the real one is *fear to expose his ignorance.* Another declines because he will not associate with quacks,—when, if a lofty bearing, an affected superiority, and boasting of his own performances, his most exorbitant charges, and a wholesale denunciation of his professional brethren, is any evidence of quackery, *he is certainly the man. He* will not lend *his* distinguished influence to Dental Society, nor would he be seen calling on his neighbor, much less estimating him worthy to perform any operation for him,—his own profound example, if he should do so, would send every one in town to his Dental friend, to whom he had shown so much condescension. He is the oldest practitioner in town, if not "town-born." The field fairly belongs to himself; nobody else has any right in town. When you come to the nicety of the thing, he cannot endure new-comers assuming so much as competency to fix the teeth of families, of which he has had the care so long, (and possibly been tolerated because there was no one else convenient to employ.) As Dr. Adam Clark once said of a brainless aspirant, "he could ill brook an equal, and worse tolerate a superior."

There is, also, a large class of men who seem to make the greatest effort, (if the value they put on their own productions, is to be taken as a guide,) to see how worthless their services can possibly be.

How much do we suffer from looseness of criticism from Dentists,—an undervaluing of another's professional reputation. "A good name is more to be prized than rubies," but many will band it about as if it were a mere foot-ball, to be tossed at pleasure. How mean the disposition! While pretending to compliment a man, to kill him with faint praise,—to call him silver or platina, when he is gold. "A very nice man he is, but he cannot fill teeth; he does not understand the treatment of the diseases of the teeth, in all their various ramifications."

There is your one idea, or hobby man,—a man who would

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sooner let a tooth go to decay, than fill it with any thing but gold, even if it would preserve the tooth for ten years. One would not set a tooth on any thing but platina for "love or money." Another has conscientious scruples about rubber-work. As he loves his soul, he will not touch it. His own favorite is the only one he will touch. He considers a mouthful of crockery, "all in one piece, as complete as a saucer," the only style of work *honest* men ought to insert. The beau ideal of another is gold or cheoplesty.

When we come to operatic Dentistry, the one idea man must know the manipulation has been just according to *his notion*, or it is not done at all. A tooth must be plugged with sponge gold. Another will have the plug all malleted in from the extremity of the fang to the topmost crown, or it is not orthodox; or the more orthodox it is, if it has not been malleted at all, but pounded in with a horn hammer. Others equally insist that none of this will do; pressing and plugging is the only natural way to fill a tooth.

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Every one has probably felt, in the course of his practice, that if he had only the Dentists themselves to compete with, he might stand his hand in some tolerable degree, but he has found the army arrayed against him to be legion.

Some Dentists develop great generalship; they have a faculty of securing a host to enlist in their army of *offensive* operations. One is happy in producing an impression among his friends, that he is a persecuted man; that all the other Dentists in the place are combined to break him up, and compel him to leave town; consequently they must rush to his rescue, and no effort is spared to get him patronage. Another joins a Temperance Society, (which I would advise you all to do,) or the Odd Fellow's Society, or the Free Masons, one or all; or he is a very popular member of some Sewing Circle; all of which may be very well and useful in themselves; and by his great activity, and distinguished services, lay one or all of these worthy bodies under the profoundest obligation to become drummers for him. Some are fortunate enough to secure the services of their family Physician, as he passes from one patient to another. Or he may hit upon the expedient of enlisting the parson to devote a portion of his sacred time, so worthily set apart for pastoral labor,

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to proclaim the skill and virtues of the village or town Dentist, who is so condescending as to attend his Church, and listen to his most interesting sermons. Another has such zealous friends in the mercantile community,—they will not fail in forwarding a package of goods to the country, to enclose a handbill of their famous Dentist.

Still another has been so fortunate, in the selection of a partner for life, that in the one he has promised to cherish and support, has obtained one who has a tact for business, and fancies she has a talent reaching far beyond the lines of social and domestic life, and is *herself* quite equal to the lords of creation, and if it were not for the unreasonable sentiments of society; *she* would show the men that "some things could be done as well as others."

As it is, she is enabled to make known the great value of Dental operations, and especially the peculiar manner in which Dr. A., her husband, fixes the teeth so cleverly. She travels about town, making known these important truths and bits of information, like the true propagandist. She does not make a call, or social visit, without improving the opportunity to the furtherance of Dentistry. She finds gaps that ought to be filled with teeth,—teeth that should be invited out of their long accustomed resting place, to make room for some better ones, which Dr. A., her husband, can put in—and Dr. A. does not hurt; *all* other Dentists do; some very much. Or she finds great *chasms* in the teeth of her friends which ought to be filled; he has some secret of doing it without pain, and in other respects, her husband operates in a manner quite unknown to other Dentists.

Now, I am a friend to the ladies, and when they confine themselves to the duties and graces which so peculiarly adorn the female sex, they are just as sweet and beautiful as they can be; but when they step into or beyond the sphere of man, the glory of woman has departed; we respect her less.

Perhaps the *Depot men* will be impatient with me, if I pass them by without a single notice; they shall have a word. How can we estimate the weight of responsibility which rests upon the manufacturers and venders of Dental materials in this conspiracy against the peace and serenity of Dentists. It is claimed that they are constantly working to smooth the Dentist's path;

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they spend their lives, and tax their ingenuity to the utmost, to furnish ready-to-hand articles, and all *manner* of contrivances to lessen their labor, and enable them to achieve professional fame. And if the practitioners can arrive to that dazzling height, it will be as much due to their allies as themselves. But however great the virtues of this distinguished class of men, they do *some*times try the patience of their friends and supporters to its utmost capacity. It is not a small thing, after one has made with the greatest care a set of teeth, to find some of them cracked or broken, because of imperfection in the manufacture. Look in another direction, we see most manufacturers and dealers in other departments satisfied with twenty-five or thirty per cent. profit, but a tooth-manufacturer wants from two hundred to four hundred per cent. profit. It costs as much to furnish foil when gold is one hundred and fifty as when it was two hundred and fifty.

When the cost of making teeth was increased from one to two cents each, the producer only modestly required an advance of ten cents each. And if the steel-armed and blood-stained Knights of Dental deeds were not made of better stuff, and more nicely tempered, than the instruments furnished them by their kind and benevolent neighbors, they would not fail to either bend or break.

Formerly there were furnished very few instruments suited to operative Dentistry. It has not been, until the days of such things as continuous gums, crystal gold, mallet and fang fillings, that a practical man would think of finding, at a Dental Depot, suitable instruments for filling teeth. A Dentist must first learn the Dental Instrument trade, and sit down and make his own instruments.

And, now, as a palliative, not to say cure for all the Dentist's ills, let us look for a moment at some of the *horrors* which he is supposed to bring upon others; offering this as a diversion merely, lest the mind should become chronically sensitive, and patience be lost. In other words, the Patience of the Patients. If the Dentist feels that he has great cause for grievance, equally do the patients think that their cases demand commiseration. In addition to the conviction that they are losing those useful organs, the teeth, they must be subjected to hours, and perhaps

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days, of torture, with their mouth stretched from ear to ear, while a stream of saliva reaches from each angle of their mouths to the floor, in an earnest effort to save them.

We should, also, consider the weakness and nervous depression consequent upon frail constitutions, ill health, or exposed nerves. How much they endure from the common place manner of the Dentist! When their nerves are touched as with electricity, and trembling with fear, the *Dentist* is as cool as an October morning. All the same to *him* whether they are suffering to distraction, or are indifferent to the operation before them. All he cares for, they think, is to do his work, receive his fee, and make room for another who is waiting for his services. He does not seem to take into serious consideration, what a calamity it is to loose one's teeth,—how awfully one looks with their teeth all gone. To have the nose and chin approaching each other in such belligerent attitudes. To have a man screwing and scraping around in a most sensitive tooth, as if he were trying to find the place of all places which would yield the most torture, punching and digging there as if he were pursuing an enemy in his den; and, after all, to hear the announcement that "the nerve is exposed, and will need to be killed, extirpated, and filled to the extremities of the fangs." "If I have been tormented by day, and tossed upon my bed at night, and finally concluded that I can bear it no longer, and have come, by tormenting necessity, to have the cause of so much suffering extracted,—when I, like the person going to execution, repair to the office of the Dentist, expecting sympathy from *him*, (and everybody else, who is possessed of humanity,)—how business-like and professional he appears! Instead of finding one who can appreciate my feelings, the *heartless executioner* is before me! Shocking! I hate the sight of a Dentist; I cannot see one without having called to mind the cruelties I have endured from their hands. I cannot go to a concert or a lecture without having all my pleasure destroyed by the presence of a man of this horrible profession."

From this view which the patient takes of the practice of Dentistry, from their stand-point, it must be said that they suffer; but *their* sufferings are only occasional,—a few times in the course of their life. The Dentist has a continual draft upon *his*

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nervous system,—not even is he exempt in his hours of sleep and food.

Is it any wonder that the members of the Dental profession do not live out half their days? I have not been surprised, when looking over an assemblage of these half-martyred men, to see such an array of *lean*, *skeleton*-like figures before me,—every one of which, with but here and there an exception, look as if they had gone down into a pulp cavity, and canal of a molar tooth, and *even beyond*,—turned himself around, and come out again, which is no very hard task for one who has been subjected many years to Dental pressure, and consequent physical reduction.

In view of this whole subject, I can do no better, my afflicted professional brethren, than to quote the highest written authority regarding it,—"In patience possess ye your souls."

APPROXIMAL CAVITIES.

BY DR. JOHN T. METCALF.

[Read May 17, 1865.]

The most superficial observer cannot fail to note the advance of the profession in all its branches. In Theory, as well as in Practice—in Medicine and in Surgery the signs are patent to all. The word is *onward*, and in obedience to it, a sturdy band of conscientious workers—believers in the virtue of labor—laborers with the pen, and with the plugger, press steadily forward. The triumphant storm and capture of that "impregnable" fortress, Alveolar Abscess, was a great achievement, and marks the commencement of the *new era*. For now light and knowledge are pressing down upon us like a flood, so that he who would not go on with the tide, must go under. And the effect is palpable. Improvements in all sorts of materials, in foil, in implements, and in *methods*, have followed in due course and in rapid succession. They might be enumerated almost

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without end, but such is not my purpose. Perhaps there is no single operation which so strikingly illustrates and demonstrates this advance as the method of preparing and filling Approximal Cavities, as taught and practiced by the best operators of the present day, in contrast with the mode employed for the same purpose but a few years ago. Indeed, it is not so very many years since it was unblushingly taught that it was of no use to fill such cavities at all; that he who did so, periled his reputation, and to no purpose.

This teaching was not so strange after all, based, as it was, on the fact that such fillings were almost universally failures. Even at the present day, by far the larger proportion of plugs, which prove to be failures, are in approximal cavities. To fill as it should be, the simplest spot in the grinding surface is not to be done without a good degree of skill, not to speak of a certain natural dexterity of the finger tips, which seems to be by no means a universal gift.

The easiest cavity is difficult enough, but the obstacles are wonderfully increased and multiplied, when decay presents between two teeth which are so close that a fine instrument barely explores the cavity. Whatever then will lighten our labor, in this direction, and tend to increase the value and usefulness of our work, should be of interest, and claims our earnest attention.

Without stopping to inquire what have been the causes of failure, I will simply proceed to enumerate and recommend such methods and expedients as have been found useful in the operation.

When called upon to treat approximal decay, obviously the first consideration, and, perhaps, the most important, is the method by which free access may be had to the carious spot; for the reason that on this mainly depends the ultimate character of the filling. Without fair and free access to it, the final result will be an imperfect and quite inadequate plug. The first and chiefest consideration then, in treating the subject, is, *How to get at it.*

The most important means used for obtaining a separation between the teeth, so as to give room for the work of preparing and filling the cavity, are the file, the chisel, wedges of rubber,

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cotton, and wood. These all come in play according to the requirements of the case. Space may be obtained by passing a thick file between the teeth, leaving a square shoulder at the necks to prevent them from coming in contact again. This was considered, at one time, the only legitimate practice, and still claims some scattered adherents. It is perhaps needless to give all the objections to this mode, but at the risk of being tedious, I will briefly state some of the reasons why it should not be resorted to.

The incisors and bicuspids are made unsightly by it, giving them an artificial, picket-fence aspect, which, however well the teeth may be preserved by it, is to say the least unpleasant. The crowns of many teeth are so much larger than their necks, that the shoulder cannot be formed without destroying a very large part of the tooth. By the constant crowding of food into these spaces, the gum becomes inflamed, and afterwards more or less absorbed, to the manifest and permanent injury of the organs. To prevent the accumulation of food between the superior incisors, which have been so separated, it is recommended by some, to cut away with a chisel the thick posterior edges, in such a manner as to leave no parallel surfaces, making the space quite open and free to the anterior edge. By this treatment the teeth are robbed of that important portion of their substance, by which they are accustomed to support themselves in position—and may be compared to a train of cars without buffers. Deprived of this, if they are disposed to fall together, they do so till their edges lap,—producing an unseemly deformity, and resulting in decay, which is more difficult to treat than the original defect. If they are *not* disposed to move, and the teeth have been well filled, they may remain many years in good condition, and without giving much discomfort, although not so well fitted for biting and masticating as before the operation, by reason of so great loss of substance.

In my opinion the file should very seldom and very sparingly be used between the front teeth, for the purpose of obtaining space; for the reasons that it mutilates and defaces the organs, frequently makes them sensitive to a painful degree, and increases the chances of future decay by the filed surfaces coming in contact. But the best of all reasons why they should not

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be filed, is, that the work may be better done by another method.

It is the practice with some to introduce rubber between the teeth which are to be spread, allowing it to remain several days, till the inflamation caused by it subsides, when the space being sufficient, the cavity is filled, and the tooth permitted to return to its place. This plan, though sometimes permissible, is subject to some very serious objections. 1st. The time required to effect it cannot always be had. 2nd. The pain, which is severe and often intolerable, must be endured several days; and 3rd. The danger the tooth so treated may not return to its place. I have seen several cases where the teeth have been permanently dislodged from position by this method. One, in particular, I call to mind, in which a front incisor of a young lady was caused to protrude considerably beyond the others, and could never be coaxed back to its place again. In this case, the rubber remained between the teeth *six days!* In my own practice, when I think necessary to use rubber, which is but seldom, I do not allow it to remain between the teeth more than twenty-four hours, which is sufficient, with the help of a gentle wedge of wood to make ample room to fill, and yet the teeth have not become so very sore as to make the operation unendurable. Nevertheless, rubber may almost always be dispensed with, and the wedge of wood used in its stead, which is the most economical, and, in other respects, the best method of separating the teeth.

A strip of hickory, say four inches long, is cut to a wedge-shape, with a very gradual taper on two opposite sides. The other sides are cut parallel, and as thin as possible and not endanger its turning between the teeth. The sharp edges should be slightly beveled to avoid unnecessary laceration of gum and periosteum. The point of this is introduced between the necks of the teeth—pressing down the gum slightly—and driven home with the mallet. One, two, or three smart taps will generally make sufficient space. The pain is considerable, while the wedge is being driven, but subsides immediately after. It may then be cut off with cutting plyers inside and out, when it forms the best possible dam to keep the work dry. The cavities having been filled and finished with perfect facility, the wedge

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may be removed, when the teeth instantly resume their places as before the operation.

On the whole, I find but one objection to the use of the wedge of wood for separating the teeth—the pain caused by the violence and concussion. True, it is of but short duration, yet some nervous patients can barely suffer it; and while the greater part are willing, by our advice, to endure it, still it should be our earnest consideration to modify and lessen the pain of every operation, as far as is consistent with the welfare of the teeth. Nevertheless, it is difficult to over-estimate the importance and value of the appliance. Some few timid ones may object on account of the pain, but the large class of patients will be found perfectly willing to endure all necessary suffering for the sake of a perfect operation. This class, it is encouraging to know, is increasing year by year, with the spread of general intelligence, and more especially by the diffusion of Dental information among the people.

Having now room to work at our approximal subject, the preparation of the cavity may go on with proportionate facility. The removal of the thin edge with chisels or files, must be thoroughly done, but always with the intention of restoring the shape of the tooth with gold. When extensive decay occurs between the incisors, it becomes necessary to cut away more or less of the front enamel plate. This must be done with a firm hand, and without suffering ourselves to be influenced by the entreaties of those who would fain avoid the display of shining metal between their teeth.

The better plan is, at once to secure a firm edge all round, by which the tooth and filling will always remain clean and bright. Any deviation from this course will certainly result in the ultimate discoloration of the tooth. The cavity, if large, must be carefully shaped to retain the gold—with sufficient under-cut, yet not so much as to weaken the walls, or render the solid packing of the filling at all uncertain. The cervical wall or line nearest the gum—a part of the cavity very commonly neglected, and which soonest shows signs of failure—should be clean cut and strong. A straight, or slightly bent, round pointed, spoon-shaped excavator, is useful for this part of the cavity. Retaining points are to be drilled in convenient spots, avoiding the

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pulp cavity. When decay extends over the cutting edge of an incisor, the corner should be well rounded, and a vertical, or nearly vertical retaining point drilled at the cutting edge. So with the bicuspids. When the *fissure* dips into the approximal cavity, or so near as to weaken its roof, which, by the by, is almost always the case—the sides of the fissure must be cut away as far back as the cavity extends, and a retaining point of good size drilled there, to give strength to the filling, and enable it to resist the blows of the antagonizing tooth.

If now the edge of the cavity has a smooth bevel all round, it is ready for the gold, the introduction of which, though requiring on the part of the operator a good degree of strength and of patient endurance, does not call for so large an exhibition of skill, ingenuity, and management, as the preparation of the cavity. It will, therefore, for the sake of completeness, only be necessary to state that the retaining points and under-cut should with serrated pluggers, be firmly packed with adhesive gold, under the judicious blows of a mallet, rounding out and restoring the tooth to its original contour. The filling is now filed and polished, by which process the Dentist puts his signature upon it, which is almost as legible to those who observe, as though engraved in fair characters on the metal. The wedge being removed, the tooth returns to its place, as near ready to perform the functions of a perfect organ, as the present state of art will admit.

To recapitulate:—The points which I consider worthy of especial attention are briefly these:—1st. To separate the teeth, and obtain room to work by means of the wooden wedge. 2nd. To bevel the edge of the cavity in such a manner as to secure a strong edge. 3rd. To fill with adhesive foil, or sponge gold, with serrated points and the mallet.

Each of these heads should be made the subject of a separate paper. I have barely touched upon them in an imperfect manner, and many important considerations occur to me which I have not mentioned.

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FILLING APPROXIMAL CAVITIES.

BY DR. W. W. SHEFFIELD.

[Read May 16th, 1865.]

There is, perhaps, no one subject connected with our profession of more importance than this operation. As much as has been said and written upon it, still the subject is unexhausted. Some may think, as did a member of the profession who, on being solicited to join a certain Association, declined, denouncing them all as humbugs, though admitting, at the saame time, he would "like to know how to cure abscesses, necrosis, &c.," but did not want to know any thing more about filling teeth; he had reached the ultimatum in that direction. Now, is this a fact, in reference to any man's operations, although their character may have been rapidly improving for the last ten years, as all "earnest, honest" workers have been? I think not. Rather, how many of us even approximate perfection, especially in filling cavities upon the proximal surfaces of the lower teeth?

It would be impossible to enter into detail upon this subject, in the short time we shall have together to-day, for in the several classes of approximal cavities, we find almost an infinite variety of modifications. Hence, I propose, as briefly as possible, to give a general idea of my present manner of operating in each class, which, by the way, I claim as nothing new, though it may be new to some. I say present, because I expect, if I remain in the profession five years, to fill teeth better than I do now, and, perhaps, better than any of us have yet dared to conceive of its being possible to do it. In that time, an Atkinson, Taft, or McQuillen, may discover, in their research for knowledge of the human system, some way to reproduce dentine and enamel, which would hardly be more astounding than what has within a short time been learned relative to the reproduction of periosteum, maxilary bone, and process.

If approximal cavities in incisors or canines are "presented,"

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the first question that arises, is the best course to pursue to get ample room, for without it, the result of the whole operation can but be imperfect. If the cavities are large, it frequently becomes necessary to use the file, or chisel, in order to obtain borders of sufficient strength. Such teeth may be separated immediately with a wedge of wood introduced between them by a few "smart taps with the mallet." The wedge should be so formed that the whole festoon of gum will be pressed against the alveolar process, the bleeding stopped, and the cervical margin of the cavity exposed. But if the cavities are limited, I avoid cutting or filing, except just to smooth margins.

In persons of a good constitution, the gums and periosteum healthy, rubber may be the best material to effect separation, which can be produced in twenty-four or forty-eight hours; but in cases of an opposite character, I never use it. Such cases should be separated with cotton or flax, occasionally moistened in weak iodine, renewed every day or two, the pressure being very slight at first, and occupying from ten to fifteen days. Teeth separated in this way require the wedge, not only to keep the gum from bleeding, but to support them during the operation of filling. The decay, as a rule, should be entirely removed from any cavity, though, rather than expose a pulp, I let a portion remain, if but partially decomposed; but in all cases it should be entirely removed from the lateral and cervical walls near the orifice.

When this part of the operation is nicely performed with sharp hoes, or hatchets, we are ready with flat, square-edged drills, to prepare retaining pits, which should usually be upon the cervical and opposite walls. This done, the cavity should be counter-sunk so that, when filled, the gold may lap over on to the enamel, except in cases where it is preferable to preserve, as far as possible, the shape of the tooth, the anterior plate of enamel, if thin, may be beveled from the outside so that, when filled, the sharp edge may be grasped and held firmly by the gold.

When all extraneous substances are cleared from the cavity by syringing with warm water, and a thorough wiping out with bits of bibulous paper, we should begin the filling in the retaining pit, or pits, nearest the gum. The gold should be carried to

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place on a serrated instrument, but a little smaller than the pit, and thoroughly condensed with the mallet, so that the plug may be built upon it without its changing position. After welding each "consecutive piece upon the gold already introduced," until two-thirds of the diameter of the cavity is filled, it should, in like manner, be adapted to the opposite pits and walls. Then add to the whole surface of the plug, with fine points, until it projects beyond the margin of the cavity, so that when dressed to a proper surface, which should be slightly rotund, all the indentations produced by the instruments may be obliterated.

Next, we will consider proximal cavities in the bicuspids:— My usual practice, where the cavities are small, is the same as the above described treatment for small cavities in the incisors; but when large, extending nearly to the coronal surface, introduce the wedge, and with the mallet and chisel, cut down the grinding surface of enamel, and from this point cut a slightly dove-tailed groove to the bottom of the cavity, leaving the labial and lingual walls nearly parallel, if possible. Then with a square point drill make upon the cervical wall two divergent pits, upon which to build the plug.

When, as is often the case, either the anterior or posterior cavity is small, and the opposite large, the larger may be grooved, and the smaller prepared and filled the same as simple cavities in the incisors; the groove giving ample space to manipulate in the opposite cavity. I never attempt to separate the molars by slow pressure, when there is an "approach to a full denture." If the cavities are small, introduce a triangle wedge, and separate with a v shaped file, leaving the space widest on the buccal side in the upper, and lingual in the lower teeth. If large, groove the same as bicuspids, with the exception that the tooth grooved, if but one, must be the anterior, thereby exposing the posterior cavity.

It is sometimes difficult, in small mouths, to form definite retaining pits in cavities upon posterior proximal surfaces of second lower molars, even if grooved, though the general form of the cavity may be correct. In such cases, I fit a wide wedge, say half an inch in length, of soft wood, introduce from the top and allow the patient to bite it down firmly to place, then with bur, or chisel, cut it away so that the gold will protrude enough

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to finish flush with the borders of the cavity. This arrangement will be found very convenient, when using "Wood's Fusible Alloy."

If gold is to be used, the filling should be commenced at the lingual cervical angle, and so fixed that it will not move until the bottom is completely protected, then build up, packing against the walls and wedge, a little in advance of the centre, using curved or crank instruments, so that the condensing force will be made in a line with the axis of the tooth. We frequently find, however, cavities on the posterior surfaces of molars, when we cannot use the wedge, the posterior tooth having been removed, or when they are complicated with buccal, lingual, or palatal decay, leaving the crown angle, if not already broken, so frail that we are obliged to cut it down. Such cavities may be built up with greater facility by fitting a wide clasp of gold round the tooth, grasping its anterior angles, and so as to compress the gum below the cavity. It should now be firmly secured with binding wire, or floss silk, and the interspace near the gum, if any exists, nicely caulked with foil so as to prevent the encroachment of moisture while the pits are being filled, and the gold extended all over the floor of the cavity. Upon such a foundation, the lost portion of the crown may be restored, so that it will subserve all the purpose of the natural organ.

MEANS OF CONTROLLING FLOW OF SALIVA.

BY DR. W. W. SHEFFIELD.

[Read May 16th, 1865.]

The only appliance necessary to prevent the access of Saliva, while filling any of the anterior teeth, is a mat of four or five thicknesses, of bibulous paper, placed between the gum and lip, and a folded napkin upon the palate, or under the tongue, behind the teeth. This position may be easily maintained with the index, and second, or thumb, and index finger. But long operations, upon the lower molars, require more care to exempt

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them from moisture. Mats of bibulous paper, placed upon the ducts of the Parotid, submaxilary, and sublingual glands, with a folded napkin upon the tongue, held firmly with a forked spring, one tine holding the paper, and the other the napkin, against the gum upon the lingual and buccal surfaces, are efficient, in most cases, where the operation will not require more than an hour.

But I have sometimes met with patients, with such a superabundant secretion of Saliva, that all mechanical means of controlling it, even for a few moments, proved futile. This condition may be occasioned either, locally, by the use of tobacco, carious, or broken teeth, inflammation of the throat, or by the influence of some cause which acts upon the whole economy. This is especially the case with mercurial preparations, though ptyalism sometimes accompanies pregnancy, and is frequent in certain diseases. Astringent mouth washes, such as solutions of acetate of lead, or sulphate of zinc, will, in some cases, suppress it for the time being; but if those do not succeed, recourse may be had to constitutional treatment.

All allopathic writers upon the subject, I believe, recommend the various laxatives, but not having tried them, cannot speak from experience as to their virtues. I have employed, however, homeopathic mercury, nitric acid, iodine, iodide potassium, and hepar sulphuris, with marked effect.

Mercurius vivus, 3d dect. trict., given in one grain doses, every two hours, for a short time, will, if not its cause, diminish inordinate flow of Saliva. One drop doses, of officinal tinct. of iodine, will also have the same effect in some cases. But if caused by abuse of mercury, pure nitric acid, given in one drop doses, diluted with a table spoonful of water, is our best remedy, though iodide potassa, 3d dect. trict., or hepar sulphur the same strength, given the same as mercurius vivus, may sometimes be indicated.

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WHAT CAUSES THE TEETH TO DECAY?

BY DR. ISAAC WOOLWORTH.

[Read October 4th, 1865.]

This is an old and often repeated question; one which doubtless will remain unanswered, to the satisfaction of all inquirers yet, a long time. It is a question which has doubtless puzzled the Dentist, as well as those who have suffered from this somewhat occult cause. Nor do I suppose that inquiry and speculation will altogether cease when I have had my say about it. It is not to be admitted, for a moment, that effects so apparent and distressing cannot be traceable to their true and legitimate causes. Many theories have been promulged to account for phenomena which have caused so much distress to our race, and which have taxed the thought and labors of so many men, for so long a time.

One of those theories is a microscopic one. I do not propose to quarrel with the testimony of so close and accurate an observer as the microscope, but I think the theory which appears to me so improbable, is rather the creation of the theorist than the actual revelation of so competent and clear sighted a witness as that wonderful instrument. That theory is, that caries of the teeth arises from causes within the structure or component parts of the organ, or that it is molecular in its origin. This theory is so repugnant to the impressions of the most casual observer, that it scarcely needs a notice.

The most current theory, and the one on which I shall base my remarks at this time is, that caries, or the dissolution or disintegration of the solids of which teeth are composed, has its origin in causes other than in the teeth themselves. It is highly probable that the teeth receive more injury from immediate contact with external substances than from all other causes. The vitiated oral secretions, in which they must be actually mascerating all the time, when such an abnormal condition exists, is no doubt a very prolific cause. A condition called atro-

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phy, which, as its name implies, is a wasting away of a solid body, such as a tooth, by a paucity of vital forces. This may have the effect to render the teeth more susceptible to the action of external agents, and hence, as by a double process, decay goes on more rapidly than when only one agency is in action. So, during a long and wasting sickness, the teeth seem to disappear as if by magic, influenced by this double cause.

In the disease called rachitis, or rickets, we have an example of the effect of disease on the oseous structure. It affects children, and is characterized by a bulky head, a crooked spine, depressed ribs, bilging out of the sternum, enlarged and spongy articular epiphyses, tumid abdomen, short statue, wrinkled flesh, together with clear, and often premature mental faculties. In this disease, the bones seem to be deprived of their earthy salts, and they become limber, producing those distorted figures which we see. So the teeth, in some mouths, appear to lack that rich creamy color which we recognize in the full developed and healthy Dental organs. This, I think, arises from a want of proper nutrition—a poverty of the blood, caused by a deficient nutriment, either in quantity or quality, or both. Deficient nutrition will cause even a weakened state of the organs and powers of nutrition and assimulation themselves.

The fact that so much of the common food of the people is made from fine flour, which, through the process of bolting, is deprived of more than half of the muscle and bone making material, may be received as one of the causes of the wide spread destruction of the teeth. Fine flour contains only thirty pounds in five hundred, of bone material, while grain contains eighty-five pounds, and bran contains one hundred and twenty-five pounds.

This is shown by a well authenticated chemical analysis. These facts should teach the importance of using such food as contains the requisite elements for developing and sustaining a perfect organism in all its parts.

By close and careful scientific researches, we have already sufficient light on this subject, if we would bring it out and let it shine, to guide us and those whom we should guide and enlighten. Nature is always independent in the administration of her laws, and those who disregard, or depart from them, cannot

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escape the consequences. It is evident that children, whose bones and muscles are growing, should take for food those substances which contain a due proportion of bone and muscle producing material, or they cannot have them. You cannot gather figs of thorns, or grapes of thistles. And then, again, adults require the same constituents to sustain the organization of the body that the young do to produce it.

Condiments and confectionaries are also detrimental to the teeth, especially the latter, partly because of the various chemicals used for coloring. For green, carbonate of copper or arsenite of copper.—For yellow, chromate of lead.—For red, red lead, vermilion, or cinnabar; and for white, white lead is used. All of these substances are wholly inadmissible into the stomach, because they are poisonous.

And then, again, all acidulated candies are flavored, not with the juices of fruits which they so nearly resemble, the names of which fruits they bear, but with mineral acids; every one of which act chemically upon the teeth. Pure saccharine matter is not deleterious to the teeth when used in moderate quantities. But when used in excess, it is converted into lactic acid, which, like sour or acid substances, mingling with the saliva, attack the limy portions of the teeth, producing decay. It is not of so much consequence what is eaten, providing the substances taken are nutritious, and taken at needful hours, and in suitable quantities, and are chemically and mechanically neutral. Good food even, taken at irregular hours, and in excess, invariably vitiates the oral secretions, either in quality or quantity, or both.

When the saliva, which, in a normal state, so essential to the beauty and health of the teeth, becomes excessive in quantity, it has an acid reaction, somewhat similar to the gastric fluids, which are powerful solvents, capable of dissolving even bones in a few hours. It may be claimed that the solvent power of these fluids are greatly enhanced by vitality or temperature; both of these conditions apply with equal force to the saliva. It is, no doubt, greatly enhanced in its solvent properties, indeed, wholly depends upon the living body for its activity. For the teeth at once cease to decay at the decease of the body, and are thereafter subject to those processes which ultimately pulverize

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and assimulate to earthy mould the bones of the body, though not as soon.

I have observed that all persons who eat between regular meals, all nibblers and tasters, such as pastry cooks, confectioners and grocers, confectioners' and grocers' boys, and candy eaters in the town and city, and frequenters of mother's pantry in the country, are subject to great activity of the salivary gland, and to early decay and loss of their teeth. Whether this increased activity of the salivary glands, or the fermentation of particles of food around or between the teeth, or the loss of vitality and sustenance, from idigestion, or innutrition, constitute the cause, the result is the same, a predisposition to decay.

A bullock taken from the pasture and put to fattening on sour distillery slops—or a cow accustomed to feed on the honeyed clover, and to yield the pure milk of poesy and of song, if forced to the rascally production of swill milk, can never again live an innocent and rural life, because both these perverted conditions destroy their teeth.

Most persons, who loose their teeth in early life, solace themselves with the delusion that their teeth are constitutionally imperfect, and must perish early. This is neither true nor necessary, for every Dentist, of any experience, can recall a multitude of cases in which an entire change of condition, and an apparent change of structure follows a reform in these respects. A case in point occurs to me at this moment, illustrative of this doctrine.

A young man, twenty years old, called on me eight years ago, to see if any thing could be done to save his teeth, which were literally dissolving in his mouth. He was a grocer's clerk, and accustomed to taste frequently the various edibles by which he was surrounded. I told him at once that no Dentist on earth could save his teeth, but with his own personal co-operation they might be very much improved. He at once resolved to be advised; and I proceeded to fill them, and to give him such advice as seemed to me necessary. This gentleman's teeth have since exhibited no signs of decay, and I saw them, and examined them but yesterday, June 20, 1865. The preservation of those teeth was due as much to his corrected habit in the care

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of those teeth, as to the operation; neither of which alone could save them.

Now, it is evident to me, that the condition of these teeth just described, was due almost entirely to the owner's mode of living—that the wide-spread and rapid disintegration present at that time, and that the change which followed, was the result precisely of what operations and instruction combined can do.

The views which I have endeavored to present, if true, reveal to us some of the causes and effects which it is the province and power of our profession to meet squarely, and resolutely endeavor to mitigate, if we cannot completely cure.

APPROXIMAL FILLINGS.

BY JAMES MCMANUS, D. D. S.

[Read October 4th, 1865.]

It may be said that the true test of an operator's ability and skill, is the class of approximal fillings he is capable of making. As has been aptly said by an eminent member of the profession,—"One of ordinary ability will make good fillings on the masticating surfaces," but to make perfect approximal fillings, requires often all the patience and skill that the most accomplished manipulators possess. The object in filling, being the preservation of the teeth for years, there is more to be looked for than the mere insertion of a gold filling that will remain for an uncertain length of time, lulling the patient into a state of security, to be painfully aroused by fresh troubles beyond the original point of decay, after a few short months, or at farthest, years. This class of operations have claimed the attention of all earnest men in the profession, from the earliest days, and I am inclined to the opinion that it always will.

Every operator of experience has noticed failures in his own practice, where his best efforts were made to ensure perfect operations, and where it can be truthfully said, at the time the

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operations were made, they were perfectly done. That many approximal fillings are failures, is no doubt owing to the fact that they were imperfectly made, never having been consolidated at the cervical portion of the cavity, which point is, of all, the most important to be perfectly done.

In my past experience I have seen many beautiful operations from the hands of men of acknowledged eminence and skill, in the profession, and in quite a number of cases I have been obliged to remove such fillings to reach decay above the original cavity. In the majority of such cases, where decay again attacks the teeth, after they have been filled by a good operator, I here claim that the patient is wholly responsible for it. I care not who the operator may be, unless the patient pays strict attention to the care of these teeth, approximal fillings will be undermined and lost, sooner or later, the character of the teeth and the amount of neglect taken into consideration. I consider an operator fails in his duty to his patients, if he does not warn them of the danger resulting from neglect. It is his duty to do thorough work, and it is also his duty to give such advice as his experience tells him his patients need. Then if work fails, he has nothing to regret on his part.

I will briefly state my views and mode of operating, in such cases. In order to make perfect, or even fair approximal fillings, it is essential there should be an abundance of room, that we may be able to see every part, if possible, of the cavity to be operated upon, as well as to use the instruments necessary to consolidate the filling perfectly, in such a way as to inflict as little pain, or uneasiness, as possible, by the wedging of the instruments.

In my opinion, the use of instruments, clumsy, large, and ill-adapted, are a frequent cause for much of the pain that many suffer while undergoing operations on the approximal surfaces of the teeth. The various ways of separating to get at such cavities, in use for years past, are familiar to you all, and to-day there is a difference of opinion among those who speak as by authority, as to the proper mode of effecting such separations. Many speak highly of the file, and use it exclusively. Others denounce it; and one might be tempted to think they never use it. I consider it one of the most valuable aids the Dentist has

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in his operations. Many are enthusiastic on the subject of rubber, cotton, &c., and separate in that way. There are cases where it is the best plan, in my opinion, to commence a separation in that way; where the teeth are irregular and overlap each other, you get a good starting point for a wedge.

Many, at the present day, are in favor of the heroic use of the wedge, and I must confess to a little partiality for that same. In nearly all cases, I use a wedge, generally commencing with one of soft wood; often finding that all I need. I will give my reasons why I use the wedge. I prefer, where I can, to do most of the separating with chisels. In case the chisel slips, it is caught by the wedge; the gum is not injured, and no blood flows. The wedge prevents, to a great degree, the seeping of saliva and mucus into the cavity while operating. The wedge, properly driven home, will separate the teeth, and in my experience, I believe it decreases the sensibility of the teeth while preparing the cavity, as well as it keys up the adjoining teeth, preventing irritation from pressure.

After using the chisel to my satisfaction, I then dress the edges of the cavity and tooth with the file, leaving all the parts perfectly smooth, taking particular pains to pass my finger over the surfaces of the teeth, and directing the patient to pass the tongue over and about them, to detect any sharp or uncomfortable edges.

It is important that all frail, friable edges shall be cut away, as smooth, sound surfaces only can be relied on. I then, with suitable instruments, prepare the cavity for the reception and retention of the filling, endeavoring to have, if possible, good retaining points in all parts of the cavity, and particularly a sound surface at the line of the gum; for at this point the danger of early failure is greatest. If the cavity is properly shaped, the best half of the work is, generally speaking, done. After wiping the cavity with cotton, I apply cotton wet with creasote, leaving it there until I have prepared the gold and arranged the instruments I intend using while introducing the filling. The gold prepared to suit the size of the cavity to be filled, either in pelletts or rope, is then introduced as rapidly as the case will admit, taking into consideration the difficulties and the condition of the mouth, as to moisture, &c., consolidating as perfectly

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as possible, either with the mallet or hand pressure, as circumstances permit, until the cavity is filled more than flush. Then dress the filling down with files suitable for that purpose, sandpaper, polishing powder, and finish with the burnisher. I believe in the free use of the burnisher, in finishing approximal fillings. The more finished the surface of the filling and tooth, the easier kept clean and more secure the operation.

I will here state, that it depends very much on the condition, as to the efforts I make to restore the original contour of the tooth, whether it will be of advantage in masticating, to preserve a correct articulation, and for look's sake. Again, whether the patient is one that will appreciate the efforts made for his good, and who takes at least ordinary care in the way of cleanliness.

The large majority of Dentists cannot pick such patients as they would prefer to operate for, but must take such cases as present themselves. Many such, come only when they are forced, and who rarely take the subject of cleanliness into their mouth. There an operator's reputation depends on the length of time a filling remains, in spite of all adverse circumstances; and, in such cases, I think an operator is justified in making such separations as will, to a certain extent, keep themselves free from food, and enable him to put in good, serviceable fillings.

From repeated conversations with many, long in the practice of Dentistry, and those who have watched with a careful, vigilant eye, the different modes of filling approximal cavities, and from the many specimens that have come under my own observation, of operations done, many of them, years ago, and are still monuments in praise of the ability and judgment of the operators, I am in the way of conviction that, in the majority of cases, the bold cutting away of tooth substance, and wide sepations, enable an operator to put in such fillings as will stand the test of wear and neglect, the best of all. No one will deny that it requires a higher order of talent, skill, and patience, on the part of an operator, and patients presenting themselves to be operated on, when restoring the shape of the tooth is attempted; and I, moreover, believe it a waste of time, energy, and skill, to attempt such, except under the most favorable circumstances;

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and for the most intelligent and appreciative patients, I have made a few such fillings, within the past year, which I hope I may live to see occasionally for a few years to come. I have seen several failures from the hands of operators, whom I have looked upon from afar off, as being above ordinary failures, and so fear that, some day, I will see those patients return minus those fillings, or hear that some other Dentist has had them.

Unfortunately for us, as Dentists, we too often believe our efforts to have been successes; when, were we to know as much as some of our brother Dentists might tell us, if they would, our confidence, to say the least, would be somewhat shaken.

I have written this paper from a sense of duty, as a Member of this Association, obeying the Constitution, which states that Members will be expected to prepare either a paper to be read, or relate a case in practice.

Let no one think that I, for a moment, assume more than to have profited by a frequent interchange of opinion with my professional brethren. I lay claim to have done some work that has retained me the friendship of a sufficient number of patrons to keep me as closely confined to the office as is good for me. I know I have done many operations that were not as good as I could wish them to be, and in that, I, with the rest of the human family, look back on the past with feelings of regret, and cherish the hope that the future will atone, in some degree, for the past.

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"DEATH AND LIFE, AND THE RENEWAL OF LIFE."

BY WM. H. ATKINSON, M.D., D.D.S.

[Read October 4th, 1865.]

Although it may seem to be presumptuous in me to dare to discuss this confessedly abstruse and transcendently important question, yet if we do not make the attempt, we shall never become able to comprehend the doctrines advocated by others, or interpret nature so as to pronounce the theorem of her processes.

"Death" is defined to be "cessation of metamorphosis." "Disease," the same process in "partial" expression. Now, all such statements are true or false to the mind of the reader, as he apprehends them, and they are blindly accepted, or bluntly rejected by the great majority of those who care to give them attention. To my apprehension, the whole difficulty of attaining a reliable Biology lays just here, viz.: in this dividing ourselves up into "advocates" and "opponents" of any and every thing that the earnest mind puts forth.

Whereas if we would progress, we must not reject but pursue each pronoucement and process to cancellation, or set it down for farther consideration, without acceptance or rejection. For to intelligently accept, involves the understanding of the process or aphorism—and to be entitled to reject demands an even more extended survey and cancellation of statements and processes among the possibles, to enable us to clearly define that which is impossible!

Now, who has the hardihood to aver that he has "completely" surveyed the whole range of the process of ratiocination quite within the reach of the mind of man!

If it then be so, that none so say, why will men of sense and capacity, learning and great research, persist in saying that they are able to define the limit of "partial" and "complete" metamorphosis! To my poor obtuse perception, "there can be no such thing as 'dead' body, be it material or (of that refinement and co-ordination of substance called) spiritual."

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So that which is capable of being *seen* must be a body of such character and relation of parts as to arrest some portion of the pencil of white or pure (sun) light. Thus forming a shadow (ghost) which is not the body, but its symbolic representation in our visual apparatus.

What do we mean then by "living" and "dead" bodies? Is it not plain that we are here in the midst of the maze that has boggled the understanding of past philosophy? viz.: How shall we "completely" define, so as to settle forever, what *it* is that constitutes "body!"

Now, if that which has been called *condition*, be that which *defines* body, have we not elevated this into creative energy, and so changed (killed) the very means of making our "*defi*nition?" If then this diatom (proposition) be to our present ability, unresolvable, let us not despair, but set it down for "further consideration," and place it in a convenient pigeon-hole in the desk; while we address ourselves to the pursuit of our purpose, by the use of such means as may present themselves.

That we may the better get at what is meant by "dead" and "living," permit me to dogmatize that,—1st. "Death means destruction." 2nd. "Life means con-struction." 3rd. "Health is exact balance between *de* and *con*-structions." 4th. "Disease is loss of balance" between "togetherness" and "apartness."

a. "Hypertrophe," is excess of togetherness—massing.

b. "Atrophe," is predominance of apartness—distribution.

And we are now ready to say, "death and life" are "changes" that take place in bodies capable of being seen. Hence, all bodies cognizable by us are dependent upon other bodies for their continuance in being in their proper individual form, by killing them, and appropriation of the higher, and rejection of the lower corelations of entities within them.

In the light of these aphorisms, then, how eminently pertinent and true is the familiar saying,—"in life we are in the midst of death," no less than "in the midst of life we are in death!"

If, then, we can have *life* only by the intervention of constant *death* to those bodies—mineral, vegetable, and animal—upon which we subsist, how doth it become us to pay reverent heed to the process by which their wealth becomes ours, and hum-

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bly acknowledge how truly and absolutely we do not "belong" to ourselves, but to Him, to whom and by whom "are all *things!*"

The perpetuity of life in individual bodies, depending upon "renewals" from without, proves that, which we call life, to be but the function of entities and corelations of entities which we define as bodies.

There is a sense in which we may truly say that a system of organs may be dead as to continuance of its function as a whole, and yet that body not be so changed as to preclude identity of its form. Such is the condition of every cadaver, before dissolution of its organs takes place. To comprehend somewhat fully what we mean by the terms "dead" and "living bodies," our studies will be facilitated by a classification of the manifestations of "life," viz.:—

I. *Life in the absolute*, as the great source and fountain of individualized life and being.

II. Consciousness, ("I AM,")—or mental life in the individual sense, which has its degrees of manifestation all through the whole range of being, aggregate, segregate, and diffuse; from that which we call the Infinite to the, to us, invisibly infinitessimal, with the differences of degree and kind; this last being resolvable into the first.

So that each body must, to be a body, have specificity of type and need, which knows when *it* is and is not satisfied in quality and quantity of its elemental constituents. If this is not so, we have no basis upon which to classify at all.

III. *Systematic life*—or the full play of function among organs and organic constituents, whose exact equation constitutes health in the system, or corelation of organs we are contemplating.

IV. *Organic life*—or that modification of molecular life which holds molecules together, constituting organs for the use of the system to which they belong.

V. *Molecular life*—or Atomic life—this is difficult of definition, being the first example of body on this (or the hither) side

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of the impersonal diffuse presence, which holds the reign or dominion in this border land, between spiritual and material bodies, which mutually influence each other in this territory which both are so bent on subduing to their special control.

With this *plan*, we have an archetype, absolute and "subsolute," by which to examine and determine existence, subsistence, and mutual relations of bodies, distributed throughout the Mineral, Vegetable, and Animal Kingdoms, which, in exact equipoise of pronouncement, constitute the Human Kingdom.

The absolute is always a sphere. The subsolute has no inherent form, other than the spherule, which, being plastic, yields to extensity, intensity, and in one word, every possible influence of currental force, producing every possibility of shape, and other character of body, in exact accordance with the circumstances of time, place, &c., of its being brought from the amorphous state of its existence in chaotic mass into that of useful constituent of simplest, or most complicate individual body. Thus, then, every body is surrounded with a sphere of chaotic elemental mass from which it springs, and from which it derives the renewals of life's constituencies.

To our bodies, as a whole, the atmosphere is the chaos in which we are immersed, from which to draw the needed supply. But that "conscious life," thus conserved by the influx of sun influences from the atmosphere, may have a forum in which to make known, and obeyed the behests of its volitions, it becomes necessary to have an atmosphere, or chaos, of "Systemic" constituents, which we have in the juices of the flesh, enclosed within the skin and mucous membranes, but without the vascular and cell territories, in which the "organs" are constantly bathed, keeping them motile by the electro-negative character of this "mucoid sea," or "sea" of prepared food, in which they thus invite the mandates of their superior officer, that they may, when it is received, become positive to the "neural sea" of "mucous mass" in cells, in whose parenchyma reside the "molecular" rank and file, so ready to obey the order by their utmost activity to prepare "germinal matter," and lay it down in "formed tissue" for the use of the organs that they in turn

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may be able to fully respond to the demands of "Systemic and mental life."

This brings us to "granular mass,"—"germinal matter,"—or "nerve mass" proper. Here chaos is most completely pronounced; and here alone "life" is said to hold high carnival, and produce ALL "vital movement." All the material that has been reduced to definite "form" is denominated "dead." (I cannot accord with this misuse of words to convey ideas.) The heresy of the eternity of matter, as matter, lies at the bottom of such misapprehension; and so long as adhered to, must forever shut us out of just conceptions of the cause of all motion and mutation.

The same authority that denies "life" to "formed material," nevertheless acknowledges "nutrition" to all the organs of the body, but not to the "tissues."

Now, if "organs" be not "formed," material nomenclature is of such ambiguous character as to render it next to useless. And we can say no less of "nutrition," if it be not a veritable act of "life!" We may now ask,—what then is vital action? To which, I would unhesitatingly reply:—All *action* is "*vital*," because *motion* is *function* of some sort, though it be but the acts or movements in bodies dependent upon *gravity* alone! Where there is *no* life, there *can* be *no* "*body*" capable of making its presence known.

"Death" is negative—simply the ceasing of some "form" by superiority of attraction to the constituents of that form in some other like or unlike type, or form, so that "life itself only *can* continue, and death itself *shall die!*" change—pass away.

All metamorphosis beyond our perception, is the same to us as if it had no being, place, or function. Many metamorphoses are progressing in us and around us, which we cannot see, but which we perceive to have been at work when we examine evolutions of bees and moths, who have stages of life in egg, larve, pupa, and insect and moth, in perfection of adult form and function.

Were we to scrutinize closely the changes that take place in the egg, larve, pupa, and perfect creature, we should be convinced that there is but one portion of these bodies that acts exactly in the same manner, and that portion consists in cells or

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primal bodies, the diverse modifications of which constitute the various parts of body, organs, and tissues, of which the creature is made up. Nutrition, (the renewal of life,) then, must be a modified act in accordance with the place in which it takes place, or we must deny all action truly nutritive to every body, but the cell, and even a part of that insignificant primal structure, viz.: the so called nucleus and nucleolus. If, then, these be the only "living" bodies in the organism, how absolutely inverted must our conceptions be, as formerly announced; that "parents die that their progeny may live,"—so apparent among insects who lay their eggs as the final act of their lives!

That all bodies, capable of being seen, are "deciduous" and "vicarious" in "function," in the service of a "government," the plan of which is not so clearly perceived at first view, I think is now apparent. Let us pursue the investigation of *nutrition* of the cell a little further, and I think we will see that "cell *nutrition*" is nothing less than "cell *formation*" out of "chaotic mass!"

Let us see—the first "apparent" portion of a cell in "granular mass" is a "dark spot," which gradually enlarges and presently divides into two zones, and an "inner dark spot," of deeper shade, than either the zones or interzonal space—these have been denominated "nucleus" and "nucleolus." The outer zone soon clears up and "becomes" *cell-wall*, which is known by increased refractive power, rendering it quite apparent and distinct from all without and within.

At this stage, that which was nucleolus becomes nucleus, in turn, by the formation of a darker inner spot, a new nucleolus.

The explanation of the nutrition of cells involves an understanding of how chaotic mass (food: pabulum:) finds its way through cell-wall, parenchyma, nucleus, and nucleolus, to be changed in the centre, from pabulum (chaos) to granular (germinal) matter, and thus prepared to "become" successively nucleolus, nucleus, cell,—(parenchyma, and cell-wall,) from which arise the various tissues and organs of the body.

Now, it is evident that all from without, that enters within the nucleus must pass cell-wall,—cell-parenchyma,—and the dark zone, called nucleus, in the centre of which arises the nucleolus, which is itself nothing more than a dense collection of

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opake, dark granules, which multiply, increase in size, and have a tendency *from the centre.*

Where pabulum is abundant, two or more collections of these small, opake bodies make their appearance in one nucleus, and thus cells are rapidly increased in number and size.

The question here arises,—what becomes of the "pabulum" after it enters the nucleus? Is it all converted into the constituents of cells? or is a part appropriated to this use, and a part thrown out of, not only nucleus, but parenchyma and cell wall also?

And, now, we find ourselves in the midst of the jangle about what constitutes a cell, and whether there be interspaces between cells, or not, &c., &c.

A little help may be obtained at this juncture, if we consider the process of bone-making, when it arises in a cartilaginous matrix, rather than that arising in a thin membrane.

The first noticeable event is an increased vascularity; then points of ossification at regular distances, from the small vessels that are destined to occupy the centre of an "haversian system," (which is a succession of smaller and smaller laminae one within the other,) until calcific action has cut off all communication of red blood, and hardened the laminae down to the very walls of the capillary vessel, that now occupies this small canal, in the centre of the "haversian system," called the "haversian canal," the true source of pabulum to the system to which it belongs, or rather to the system that belongs to it.

The outer laminae are always the older, and have no circulation of fluid within them, other than the juices of the flesh (and bone,) that continually fill the lacunae and canaliculi, constituting the so called bone cell. After a time the circulation in an haversian canal is obstructed, and calcification prevents the blood from passing in its accustomed channel, and death to the "system" belonging to the canal ensues.

Now a new action is set up.

A disintegrative action, not very well observed, because of the immense labor and expense attending such biological experimentation.

But, nevertheless, tolerably understood by legitimate deductions from the data already in possession.

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In due course of "absorption," the old "system" is removed, and a new one instituted. These metamorphoses are more active in young than old persons, and could they be continued uninterruptedly, the most potent obstacle to a perpetuity of existence would be removed, and we should live and be active through limitless ages on this planet.

If the process of formation, destruction, and reformation of the "haversian system" be comprehended, it is plain that the metamorphoses, through which the cells are made to pass, involves their formation and destruction as the whole role possible for them to engage in.

This is clear in bone and, also, at the other extreme of organic corelation of parts, hard and soft, (i. e., nerves.) Bone and nerve are both subject to reformation, or reproduction, to such extent as to warrant exsections of portions of these tissues that would be quite unwarrantable in glands, muscles, &c., &c., were we to entertain the hope of their reproduction.

The question here arises,—How far can we remove structures and organs without causing death of the body? Also, what parts are essential to the life of the personality?

If nutrition be but the continuous round of production and destruction of cells, it becomes important that we understand what constitutes the various modifications of cells, out of which soft and hard tissues take their character and origin. There is no one cell, of soft tissue, whose whole territory is not often killed and reproduced, and yet the conscious life—the me—remains identical during all the rapid and slow changes through which the primates of the body are made to pass, in producing and sustaining the body as a whole.

"All" explanation "is but ringing the changes upon dogmatic pronouncement of the aspects of things!" "Becoming," could we fully comprehend the significance of this term, the whole process of creation and growth of individual being would be truly "explained" to our minds.

He who comprehends the "becoming" of the smallest body, must be familiar with spirit and matter, the degrees of predominance of which, are the "sine-qua-non" to individual pronouncement of body, different and indifferent.

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All individualism, being but the differencing of portions of the most indifferent spirit.

We may now inquire,—What, then, is "life?" And be permitted to reply,—That which has been called life, is nothing but the process of metamorphosis—or the mutations through which the elements of perceptible bodies pass, in the changes constituting nutrition to the specific form, or body, in which life thus manifests its presence.

Human "life," in this sense, is then simply the development and decadence of the *organs* which constitute the human body—and "death" is nothing more than the cessation of these processes.

ARE YOU A READING MAN?

BY L. D. SHEPARD, D. D. S., SALEM.

[Read October 4th, 1865.]

During the past two years, more than ever before, my attention has been directed to the subject of Professional Education.

Within this period, we have witnessed great progress, much of which is undoubtedly due to the formation of so many local societies.

It is impossible for men to meet, month after month, in these gymnasiums of thought, without acquiring new vigor and acumen. One of the first impressions which the new member receives, is a consciousness that the field of research is broader than he supposed, and that he himself has only crossed its border. He begins to study and investigate, and a few months work a decided change in his views of the profession. That this is the natural result of associative effort is obvious. I will only mention, as an illustration, that during the past winter, three members of the Connecticut Valley Association, who had been in practice five, eight, and nine years respectively, closed their offices, attended lectures at one of our Dental colleges, and took their degrees. One of these remarked to me, a few months

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since, that he had never ceased to regard it as the most important event of his professional life, that he was induced to attend our meeting at Greenfield, Mass., in January, 1864. His progress since that time has been rapid, and he attributes it all to the inspiration caught at our meetings. The same is true of the other two, and, in fact, of all the members. I have cited this case as an illustration of the results which such associations should exhibit everywhere. It is not an isolated case, and yet to me is one of great force, as it comes within the circle of my intimate knowledge, and is a result, to a cetain extent, of my own earnest labors.

This Society, to which I have transferred a large share of my interest, undoubtedly displays to you all the same reviving spirit as a direct result of its organization. The same is true all over the land, and yet, we feel, but a few sheaves have been gathered, while the great field remains unharvested. Maine and Rhode Island, as yet, have no societies; neither has New Hampshire or Vermont, although these two States have large representations in the Connecticut Valley and Merrimack Valley Associations. I can conceive of no reason why these States should be so far behind other States, except it be that no one has taken the initiatory steps. Experience has shown that all that is needed is for some active and judicious man to make the first move, and others will follow.

But I had another object in preparing this article, and have permitted the preceding remarks to open the subject, as they are so intimately connected with it. In fact, it is impossible to speak of one division of professional education without touching upon all. Our development must be *symmetrical; skill* must keep pace with *science*, and *integrity preside over all.*

There is one direction in which, I fear, our societies have failed to produce their proper results. Our meetings ought not only to make us better operators, and better informed from the observations and remarks thrown out from month to month, but awaken in each mind a thirst for knowledge, and a desire for *personal* investigation during our leisure hours.

Has this result been gained?

To answer this question, we must inquire in what ways this

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study must be prosecuted, and what means must be seized upon to gain this increase of knowledge.

Individual investigation is one of the most important. It must be a "habit" with us to make each case a study, particularly if any doubt of the result exists. To do this we must keep a case-book, in which the history shall be written of the first and each subsequent examination, with the course of treatment, and reasons for the same. In this way, we can learn, in time, *why we failed.* The use of the microscope is another. I would like to know how many microscopes are owned in this Society, and how many of our number have never seen the Haversian canals, lacunæ, canaliculi, etc., of the dentine, the circulation of the blood, and the almost endless objects of interest which this wonderful instrument unfolds to view. But the easiest and most available means of keeping our minds active, and enlarging the sphere of our information is the *scientific reading* of the day.

To this point, I desire to call your *particular attention.* I ask, seriously, as a profession, do we *read* enough? Are we up to the times, as a learned profession, in the great throes of thought, science, and progress which agitate the world? How many of us can converse on the great problems of the day throughout the world with any thing more than the shallow commonplaces of ordinary life? Is this enough for a learned profession? Can the same be said of the mass of the clergy, the law, and regular medicine? We will grant, for argument's sake, that this general erudition is not necessary for our daily duties. Furthermore, we will say that it is pardonable in a man, whose early advantages were not great, and whose time is occupied in a laborious profession, if he is not thoroughly posted on general topics. On this point we may, perhaps, all agree. But where this same ignorance, and neglect to attempt its removal, is the general status of the profession on professional topics, are we not equally agreed to plead guilty, verily guilty?

Is there any excuse for our conduct, if this is the state of the profession to-day? Our scientific text-books are not numerous. How many of us have read them all? They contain errors, and many ideas behind the times, yet their general principles are correct and absolutely necessary for intelligent practice.

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But are there no recent publications, where we can find the new theories, with the exposure of errors, old and new? If so, can we turn our backs on these and claim to be educated men? The one grand curse upon our profession, from its beginning to the present day, has been the lamentable and very general ignorance of its members. Surely, in this day of light, and progress, and general information, where the grand Christian doctrine, that "it is more blessed to give than to receive," is the rallying cry of every profession, and knowledge is almost as free as the air we breathe, what excuse can we render at the bar of public opinion if we, as a profession, are still groping our way in the dark ages?

A moment ago I spoke of the necessity of familiarity with the old text-books and the recent publications of the profession. Of course, you all understand by the latter I refer to the Dental magazines. You know what they are, their standing, and the style of their articles. I desire to plead earnestly for their more extensive circulation. Foremost stand the *Dental Cosmos* and *Register of the West*—both able magazines and worthy of our patronage. From month to month, I welcome their familiar faces. I take others, but regard these as best adapted for general circulation. There are a number of publications issued as a means of advertising certain institutions, patents, and manufactories, which have for the most part a gratuitous circulation. Some of these contain matter of interest and value, but for obvious reasons need no plea of mine.

Some may think that these magazines (*Dental Cosmos* and *Register*) do not come up to their standard, or are not conducted as such magazines should be. Who, I ask, but those very men are to blame for this? Is it any excuse for them to stand aloof, that what is done does not exactly accord with their notions? Or rather, are they not guilty, if, having decided ideas, they keep them to themselves, and thus deprive the profession of their good counsels?

I regard the magazines as exponents of the profession, conducted by men of foresight and good judgment, as well as of liberal and elevated views; they consult what is required by the profession, and publish what pieces of decent merit the profession at large furnish them with. Can we, entertaining such

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views, look with favor on men of talent who hide their talent in a napkin and keep it from the world? Can such condemn a magazine as not what it should be, when they have made no effort to change its tone? I know of no one among you who entertains such feelings as these; but I know of some who do, and whose course I must condemn.

Another reason why every Dentist should be a subscriber to one magazine at least—more if he has the means—is the duty which he owes to the profession to contribute all he can to its elevation. If scientific publications are valuable—who doubts it at this day?—they must be sustained, and every lover of his profession must be an agent to elevate their standard and increase their circulation. "Why stand we here idle?"

I have spoken of our individual responsibility for the standing of the current literature of the profession, and of our duty to the profession to help sustain it, even if we do not read it or need its instructions. I now come to the practical question, whether duty to ourselves permits us to ignore this literature. What think you of a family where the newspaper does not make its daily or weekly visit? Is such generally regarded as intelligent? Do you regard them as fit companions with whom to pass a social evening? On the contrary, are they not always ignorant, superstitious, and narrow-minded? *In what differs an office* without a professional paper? I do not see how any operator can keep up with the times, and have his mind bright and active, unless he reads every month some professional writings which are fresh and practical. How many of you agree with me in theory? You may read things which are contrary to your experience. There is a chance you may be in error, that your observations may not have been as carefully made as those of others. Or the writer may be wrong, and do vast injury, unless you correct the mistake. How many opportunities of good are lost, if you are remiss in your duty in this respect, can never be known. "Let your light so shine that men may see your good works."

Does it not seem to you to be almost needless to argue this question, and do not you think I am over-excited and spending my breath for naught? I tell you, brothers, I know what I am

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talking about, and it is with sadness that I am compelled to speak thus earnestly.

To any one of you who takes none of the literature of the profession, let my words be addressed personally, and received kindly, as becomes brethren engaged in a common cause and inspired by a noble spirit.

You have no idea of the *necessity* of this appeal. Each one of you knows personally about himself. But I know how many copies are taken in New England, and who are the favored ones. You would be surprised if I should tell you how few, how very few, copies are taken in this city; and yet this city is not behind other portions of the land.

My position on the Committee on Dental Education of the American Dental Association, has led me to study this subject with more than ordinary interest, and has furnished superior facilities.

Some of you may be aware of my interest in this subject. All, I trust, will give me credit for an honorable motive in making this appeal.

Well rewarded shall I be, if I can contribute in any way, and at any time, to elevate our noble profession, and place it higher still on the rolls of the noble and *learned* professions. And among the means of this elevation, I think the one proposed is of no small importance.

Surely, I hope, the time is not far distant when it will no longer be said that only *one Dentist in five*, in our boasted New England, is a subscriber to a professional magazine.

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MICROSCOPY OF THE DENTAL TISSUES.

BY J. H. MCQUILLEN, M.D., D.D.S.,
PROFESSOR OF ANATOMY, PHYSIOLOGY, AND HYGIENE IN THE PHILADELPHIA DENTAL COLLEGE.

[An Address delivered before the Connecticut State Dental Association, October 4th, 1865.]

Gentlemen:—When accepting the invitation to deliver an address before your body, I concluded to make the MICROSCOPY OF THE DENTAL TISSUES the theme for consideration, under the impression that it would prove alike interesting, instructive, and a prolific source of investigation to all. And although many writers and observers are disposed to regard the subject as one that has been so thoroughly examined that it is impossible to throw additional light upon it by continued research, yet all accurate observers and thinkers must admit that there still remains "ample scope and verge enough" to whet the appetite of the earnest inquirer in this direction. The celebrated JOHN HUNTER, in preparing his work on the NATURAL HISTORY OF THE HUMAN TEETH, no doubt supposed that he had exhausted the subject; and yet who, to-day, would agree with him in the assertion that "a tooth is composed of *two substances*, enamel and bone;" or be satisfied with the description which he gives of the different tissues which enter into the formation of the Dental organs?

I do not wish to be understood as underrating his valuable contributions to our specialty; but, on the contrary, appreciating them most highly, and fully recognizing the impulse they gave toward raising our calling from a mere handicraft to the position of a liberal profession, I yet cannot refrain from expressing the opinion, that had he availed himself of the aid of the microscope, (that wonderful instrument which has revealed during the past half a century so much of the minute structure of organic bodies that is hidden from the naked eye,) his work, in place of being laid on the shelf as a curious and truly wonderful production, as far as it goes, would still be used as a valuable text-book. It may be said that microscopic research in his

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day was not prosecuted with the same vigor that it has been during the past fifty years; while this is true, the fact must not be lost sight of, that Anton Van Leeuwenhoek, as early as the period between 1632–1723, with the assistance of magnifying glasses, powerful, though of very simple form, discovered and described the Dentinal tubuli. Yet, notwithstanding the valuable assistance that was here afforded to him by the labors of another, Hunter, evidently owing to a want of familiarity with all the literature of the subject, contenting himself with the description of the gross anatomy of the jaws and teeth, permitted the opportunity to pass by for a thorough account of the minute structure of the organs, and thus left the field entirely open for the valuable efforts of Retzius, Owen, Nasmyth, Tomes, and Kolliker, whose contributions in this field will ever be regarded as inestimable additions to the domain of science. Let the remembrance of the fact, just referred to, be to each and all of us a constant incentive to exertion, not only to become *observers*, but also familiar with the *entire* literature of a subject, and thus avoid falling into the error of supposing that having made some advance in any given direction, we have therefore mastered and exhausted the theme.

The subject is not merely interesting and important to us as professional men, but to the naturalist, who, in the classification of animated nature, from the days of Cuvier, has made the *general* form of the teeth one of the most important guides in determining what position should be assigned to different animals in the Zoological series, a thorough knowledge of this subject is equally indispensable in ascertaining the nature, affinities, and position of extinct species, of whose organization, on account of the greater durability of the Dental tissues, they are frequently all that remains in the geological strata. Possessing such knowledge, the paleontologist, with the aid of the microscope, has been able to decide questions which were not only attractive from the scientific interest attached to them, but also vastly important on account of large pecuniary interests involved in their solution.*

* In conformation of the above, the following is appended:—"It was in regard to *Teeth* that the possibility of such determinations was first

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In inviting your attention to the Microscopy of the Dental Tissues, I do not propose to offer to you any discoveries of my own, but rather to describe in a plain, and, I trust, comprehensive manner, the characteristic peculiarities of the tissues which enter into the composition of the Dental organs. In doing this, however, I shall present that which I have *seen* myself and *shown* to you, for you are well aware a large number of valuable sections of the teeth of man and animals, and also of bone were exhibited to you under the microscope last evening; these, in connection with the drawings which are suspended in the room, will, I trust, enable me to make the subject more clear and intelligible to you than could have been the case without them. The limited period which is afforded me only admits, I regret to say, of a hasty survey of the subject; yet I trust the time, however, will not be misspent, but may be the means of induc-

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made clear by the laborious researches of Prof. Owen; and the following may be given as examples of their value:—A rocky formation extends over many parts of Russia, whose mineral characters might justify its being likened either to the *Old* or to the *New* Red Sandstone of this country, and whose position relatively to other strata is such, that there is great difficulty in obtaining evidence from the usual sources as to its place in the series. Hence, the only hope of settling this question (which was one of great practical importance, since, if the formation were *new* red, coal might be expected to underlie it, whilst if *old* red, no reasonable hope of coal could be entertained) lay in the determination of the organic remains which this stratum might yield; but, unfortunately, these were few and fragmentary, consisting chiefly of teeth, which are seldom perfectly preserved. From the gigantic size of these teeth, together with their form, it was at first inferred that they belonged to Saurian Reptiles, in which case the sandstone must have been considered as New Red; but microscopic examination of their intimate structure unmistakably proved them to belong to a genus of Fishes, (*Dendrodus*,) which is exclusively Palæozoic, and thus decided that the formation must be Old Red. So, again, the microscopic examination of certain fragments of teeth, found in a Sandstone of Warwickshire, disclosed a most remarkable type of tooth-structure, which was also ascertained to exist in certain teeth that had been discovered in the 'keuper-sandstein' of Wirtemberg; and the identity or close resemblance of the animals to which these teeth belonged having been thus established, it became almost certain that the Warwickshire and Wirtemberg sandstones were equivalent formations, a point of much geological importance."— *Carpenter on the Microscope*, p. 641.

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ing you, as already remarked, to examine the subject yourself with the aid of good instruments, and thus *confirm* or *correct* the statements of other observers.

In this connection, let me say, it is not absolutely necessary that you should invest a large sum of money in the purchase of a microscope, for with from sixty to one hundred and twenty-five dollars, an instrument can be procured adapted to all practical purposes; and with such as these, some of the most important and valuable discoveries have been made. Every Dental Society should have a microscope.

With these preliminary remarks, the teeth may be defined as small, hard, white bodies, found implanted in the alveolar processes of the superior and inferior maxillary bones in man and the mammalia generally; while in other portions of the animal kingdom, supplied with these organs, they occupy various positions in the alimentary canal, extending, in some instances, from the mouth to the pyloris. In man, as you are well aware, the number of permanent teeth is thirty-two, but the *typical* number of the *vertebrata* is forty-four, and in the series it varies from a single tooth to as high as one hundred and forty. Varying thus in number and position, they also differ in shape, size, and microscopical structure, and in the relations which the different tissues, that enter into their composition, bear to each other, but having reference under all circumstances, however, to the *habits* and *food* of the animal; for the teeth, as the primary agents in the assimilation of the food, serve to prepare it by mastication for the important changes which it undergoes in the rest of the nutritive system.

Although presenting a variety of shapes, the general form of the teeth is either conical, wedge-like, or a combination of both. As the time allotted does not permit me to describe the shape of the different classes of teeth, I will merely state that the body of each tooth is divisible into three sections: one part projecting above the mucous membrane or gum, the *crown;* another portion received or implanted in the alveolar socket, or *alveolus*, the *root;* and a line of demarkation, not always strongly marked, between these two, the *neck.*

If a recent human tooth, an incisor, for instance, is divided longitudinally, a chamber, called the pulp cavity, corresponding

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Fig 1.

with the shape of the tooth, and occupied by a soft and highly vascular substance, the Dental pulp, richly supplied with vessels and nerves that have entered a foramen at the end of the root, will be brought into view. In addition to this, the exterior of the root will be found invested by a soft fibrous structure, the periodental membrane. These constitute the soft tissues of the tooth. On examining the solid portions of the tooth, with respect to its component tissues, it will present at least *three* distinct structures, viz.: 1, a yellowish white substance constituting the greater portion of the body of the tooth, the DENTINE; 2, a hard, vitreous, translucent substance investing the crown, the ENAMEL; 3, a cortical structure, generally disposed in a thin layer around the root, the CEMENTUM. In addition to these, a fourth substance is not unfrequently observable, intermediate between dentine and bone, the OSTEO-DENTINE of Owen, or the SECONDARY DENTINE of Tomes.

As a primary object, in this address, is to induce you to become observers, it is advisable at this point to describe how miscroscopical sections of hard structures like bone and the Dental tissues are made; for the errors into which investigators have frequently fallen, have been due either to the employment of defective instruments, or the imperfect manner in which the preparations under examination have been made. The necessary appliances for the accomplishment of this purpose are, a fine watch-spring saw, files, and water of ayr-stones; or, what is still better for the purpose, as it will effect the work much more rapidly, a lathe, to which can be adjusted a disk of soft iron like that used by the lapidary, charged at its end with diamond dust, corundum wheels, and Arkansas stones, for the purpose of making and polishing sections of the substance to be examined. In addition, oblong slips of plate-glass, that should be clear, free from veins and bubbles, on which the preparations are to be

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placed, and very thin glass for covering them, which can be obtained from opticians, of a standard form and size, agreed upon by microscopists, along with the Canada balsam and a spirit-lamp, are required.

The first thing to be done in the preparation of a specimen, is to obtain a longitudinal or transverse section, as thin as it can be safely cut with the saw or circular disk. This section is then attached to a slip of well-annealed glass with Canada balsam, and filed or ground down until it becomes translucent, care being taken to have the pressure applied with such equality that the thickness of the section shall be the same in its entire structure. By occasionally examining it under the microscope during this process, any inequalities that may be present can be detected. Having obtained a perfectly smooth and polished surface, by gently warming the glass, the section can be detached, and, with the finished surface turned downward, may be transferred to the permanent glass slide, to which it is to be united by Canada balsam. The upper surface of the section is then treated in the same manner as the opposite surface was, until a perfect microscopical section is obtained, when it should be covered with the thin glass, and the latter secured in position by a black cement surrounding its edge. In using the balsam, great care should be exercised to prevent the formation of air-bubbles, as these injure the appearance of the specimen, and the true character of the structure cannot be made out with any satisfaction. This can be best effected by placing a drop of balsam on the glass slide, and then, holding the latter over the flame of the spirit-lamp, when this becomes sufficiently warm, the object can be brought in contact with the balsam and pressed evenly and gently against the glass. In placing the thin glass cover in position, it should first be warmed on the under surface before it is laid over the specimen; if this does not suffice to attach it, the under surface of the slide can be warmed so as to soften the balsam. Care should be exercised, however, not to apply too high a heat in this operation, as it may cause the specimen to curl up, and destroy its usefulness for microscopical examination.

An easier method of obtaining sections than that described above, is to place a tooth in the lathe and make shavings of it

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with a thin, sharp, and well-tempered chisel, or to put a tooth that has been slightly softened by acid in a vice, and then take off thin slices with a sharp razor.

Those who may not feel inclined to incur the time and trouble incident to the preparation and mounting of specimens, can procure good ones at a trifling cost, from prominent opticians in our large cities.

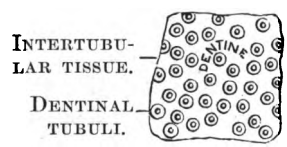
Those, however, who purpose to carry out a line of investigation for themselves, cannot depend entirely upon such sources, but must frequently rely on their own efforts in the preparation of specimens, and hence the importance of knowing how to make them.

Having secured a longitudinal section of a human tooth, it is found to be made up of three distinct structures, of which the first is a substance, now to be described,—named, by Prof. Owen,

DENTINE.—This tissue, which was formerly called *ivory* and *tooth substance*, and constitutes the greater part of the crown and root of a tooth, and gives to it its general form, and incloses the pulp cavity, in a perfect human tooth, is never exposed at any point, but is perfectly protected from the influence of external agents by the dense and impermeable enamel covering the crown and extending by a thin layer to the neck, and where this ceases the cementum commences to invest the tooth. The satiny aspect which a section of dentine presents to the naked eyes gives it the appearance of a perfectly compact solid structure, but under the microscope it is found to consist of a multitude of fine canals, the DENTINAL TUBULI, and a connective matrix, or intervening substance, the INTERTUBULAR TISSUE.

The DENTINAL TUBULI are generally described by microscopists as having distinct parietes, or walls, formed of harder material than the *intertubular tissue*, whose thickness is much less than the diameter of the tubuli, which, in the largest, according to Tomes, is about $\frac{1}{1000}$ of an inch. It is difficult to distinguish these walls in longitudinal sections, but in *transverse* sections, what appears to be a narrow ring is readily observable surrounding each

Fig. 2.



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tubule. Whether this is an optical illusion induced by the waving character of the *secondary curvatures* of the tubuli, is a matter of question with many. Be this as it may, there can be no doubt entertained by any one at the present time relative to the fallacy of the opinion advanced by Nasmyth, that the *tubuli* are not canals but *solid fibres*, with brick-shaped cells built around them. How this distinguished and laborious observer could have been led into such an error, is difficult to conceive, as the tubular character is readily demonstrable by the passage of colored fluids and minute bubbles of air along them.

The TUBULI originate by open mouths on the walls of the pulp cavity, and proceed in a slightly wavy and radiated manner through every portion of the dentine to its periphery, where they generally terminate, although in some instances extending beyond and penetrating the enamel, or the cementum, in the latter of which they communicate with the *lacuna* through the *canaliculi*. Toward the masticating surface of the crown, where the occlusion of an antagonizing tooth has to be received, they are vertical, or nearly so, and horizontal where the pressure of contiguous teeth has to be resisted; by this arrangement, a certain amount of elasticity is gained, and the shock of occlusion and pressure is more generally distributed over the entire structure. The wavy character of the tubuli, above referred to, consist of two or three large, or *primary curvatures*, and a number of smaller, or *secondary curvatures*, which follow closely upon each other, and are estimated by Retzius as numerous as two hundred in a single line.

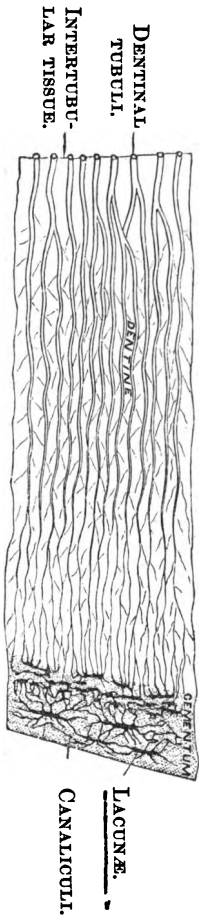

Fig. 3. VERTICAL SECTION OF THE ROOT OF A CANINE TOOTH, AFTER LEIDY.

Starting from the pulp cavity, in

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close proximity to each other, the divergence of adjacent tubuli is so slightly apparent, that they seem to run parallel with each other. In following them out, however, toward the periphery of the dentine, the divergence in the crown is readily observable on account of the increased distance between them and the ultimate dichotomous division, without at first much diminution in the caliber of the tubes. These branchings increase in number and decrease in size the nearer they approach the periphery of the dentine, and they either anastomose with each other, pass into the enamel or cementum, terminate abruptly, or in very minute cells. In addition to the large branches just referred to, innumerable fine branches are given off from the sides of the tubuli, which penetrate the intertubular tissue and anastomose with each other. In this way the most perfect arrangement for the passage of that nutrient fluid, the *liquor sanguinis*, to every portion of the tissue, is effected.

Up to within the past few years the dentinal tubuli have been invariably regarded by histologists as conduits for conveying to the *tubular* and *inter-tubular* tissues materials inservient to repair the constant molecular disintegration or waste which takes place in dentine as in all other living organic structures. Of late, however, Mr. Tomes has discovered, under the microscope, a number of FIBRILS projecting from the dentinal tubuli, which he is diposed to regard as continuations of the nerve fibres of the Dental pulp, and in confirmation of this discovery, Dr. Lionel S. Beale, in his work on "THE STRUCTURE OF THE SIMPLE TISSUES," says that he has been able to verify this statement, and, furthermore, that they are not "conduits for nutrient fluids which transude through the walls of the vessels, and are supposed to pass along the tubes to the outer part of the tooth." Last evening, among other microscopical specimens, I showed you a section of dentine presented to me by Dr. Allport, of Chicago, in which these *fibrils* were readily seen projecting from the dentinal tubuli. Now, it is a matter of question with me, whether the

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NOTE.—In the illustrations accompanying this Address, from Tomes, Leidy, and Kolliker, the plan in *Gray's Anatomy*, of placing the names of different parts on or near them, has been adopted, in place of the usual numbers and foot-notes.

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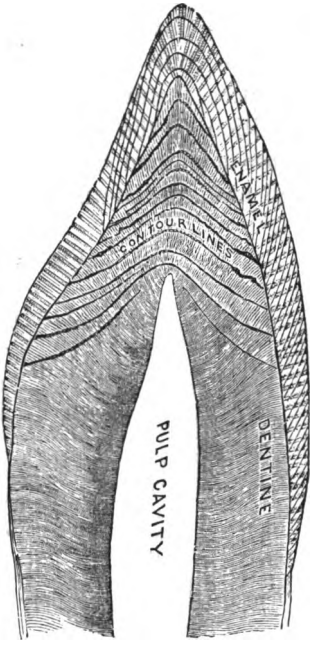
fibrils exist as "a soft, solid substance" in the *living* tooth, or are formed *after* its extraction.

You are well aware that when blood is drawn from an artery or vein into a basin, or any other vessel, it *coagulates*, or separates into two portions, the *crassamentum*, or *clot*, and the *serum* or watery part. I think it is reasonable to infer that the presence of these fibrils in a microscopical section of a recent tooth, is due to the *coagulation* of the organic elements present in the liquor sanguinis circulating in the dentinal tubuli.

In a series of lectures on the "ANATOMY OF THE ELEMENTARY TISSUES OF MAN," delivered since the publication of the work referred to, Dr. Beale asserts that "there is no evidence of addition and removal of material going on in the enamel and dentine, after the completion of their formation, and it is probable that the matter upon which the hardness of these tissues depends is not removed at all after its deposition."

Notwithstanding this decided assertion, with the exception of enamel after it is fully formed, and the consolidated dentine of very old persons, the universally received opinion that there is a constant change taking place in *all* the tissues during the life of a being, is beyond a question of doubt correct. It is only necessary to refer to the absorption of the roots of the deciduous teeth, (a retrograde metamorphosis by which the dentine and cementum are removed cell by cell, as in their original construction, they were formed cell by cell,) to disprove the assertion of Dr. Beale. The evidence of molecular change in the dentine and cementum is by no means, however, confined to the deciduous teeth; for frequent and well-marked instances are brought to the notice of the Dental practitioner in which teeth, originally

Fig. 4.



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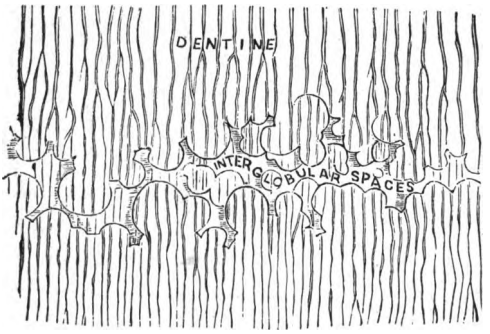
soft in their structure, and cutting readily under the instrument, become, in course of time, hard and compact, while on the other hand, teeth which are quite hard, become very soft and chalky. That this change of structure is due to constitutional influences, and is brought about by molecular change in the part affected, is more than a reasonable supposition, for it bears upon its face an air of positive certainty.

Much more might be said in confirmation of this, but I refrain from doing so at this time, and now direct your attention to what are called the CONTOUR LINES of Owen. You will observe them in this drawing, running in an arched manner, somewhat parallel to each other, and nearly at right angles with the dentinal tubuli, in that portion of the dentine which constitutes the greater part of the crown of the tooth; although thus represented in this instance, they are by no means confined to this part of the tooth, but may be found in the dentine of the root. The appearance of these markings, arched or contour lines, is attributable to the *primary curvatures* of the dentinal tubuli and the formation of the dentine in striæ or laminæ, as with the rings observable in the trunk of a tree. These markings are not always presented in a decided manner in human dentine, but they constitute quite a marked and frequently beautiful feature in the teeth of some of the lower animals. In addition to the peculiarity just referred to, which is in every sense a normal condition, certain cavities or spaces, to which the term INTER-GLOBULAR SPACES has been applied, are also observable. These spaces, which are most numerous in the vicinity of the enamel, although they occur in other portions of the dentine, are said by Kolliker not to be filled with fluid during life, but by a "soft substance, resembling tooth car-

Fig. 5.



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tilage." This dries up in microscopical sections, and cavities are formed, which give the appearance denominated inter-globular spaces. Although this cannot always be regarded as an abnormal condition, still, in defective teeth, these cavities are larger and much more numerous than in perfect teeth.

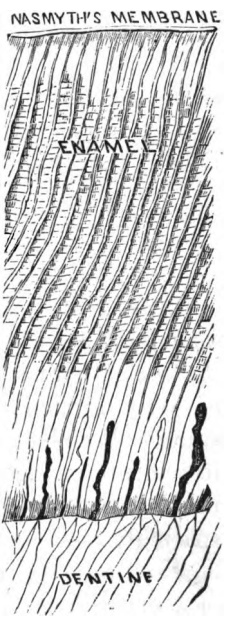
INTER-TUBULAR TISSUE.—This was spoken of in the preceding part of the Address as a connective matrix between the dentinal tubuli. It contains the greater part of the earthy constituents of dentine, and under a high power of the microscope presents a granualar appearance. The formation of the contour markings and the inter-globular spaces, of course, involves the inter-tubular tissue as well as the dentinal tubuli.

According to Von Bibra, the chemical proportions of dentine in man are,—

Organic Substance, 28·01.
Inorganic Substance, 71·99.

ENAMEL.—This substance, which is the hardest of all organic structures, covers and protects the dentine to the neck of the tooth, being thicker at the grinding surface, and gradually tapering to a thin edge at the neck. A calcified structural substance, called NASMYTH'S MEMBRANE, is found covering the enamel for a short time after the eruption of a tooth, but is eventually worn away. The enamel is translucent, rather than white, and although extremely hard, is frequently worn away by protracted use. It is composed of solid hexagonal fibres or prisms, about $\frac{1}{5\,5\,0\,0}$ of an inch in diameter, arranged in close proximity to each other, and fitting at their inner extremities into hexagonal depressions upon the coronal surface of the dentine. As you observe in this drawing, the fibres, marked at short intervals by dark transverse lines,

Fig. 6.



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run in a gentle waving manner, parallel with each other. They are nearly vertical when passing toward the grinding surface of the tooth, and horizontal on the sides.

To compensate for the increased extent of surface at the periphery of the enamel, the diameter of the outer ends of the fibres is somewhat larger than the inner, and still further to secure a perfect structure, short enamel fibres are interposed in what would otherwise be vacant spaces. In young teeth, Tomes states that canals exist in the enamel prisms.

In addition to this, fissures frequently occur in the enamel, particularly in the depressions or crevices between the cusps of the bicuspids and molars, and extend down to the dentine. When existing, these fissures constitute a decided predisposing cause of decay in the teeth. The dentinal canals sometimes extend into the enamel, and terminate in somewhat expanded cavities.

Concentric ridges or furrows may be readily distinguished, and frequently even without the aid of a magnifying glass, upon the external surface of the enamel, particularly in deciduous teeth. Their presence is to be acounted for on the same principle as the contour lines of dentine.

When subjected to the action of dilute acids, the enamel is almost entirely dissolved, and scarcely a trace of animal matter is discernible. According to Von Bibra, the chemical composition of enamel is

Organic Substances, 3·5.
Inorganic Substances, 96·5.

CEMENTUM.—This substance, which invests the roots of human teeth from the termination of the enamel to the apex of the root, where it is usually very thick, approximates to bone, not only in microscopical structure, but also in chemical composition. The *Haversian* canals, peculiar to bone, are rarely seen in cementum, except in hypertrophied conditions of the structure, but LACUNÆ and CANALICULI are always present, (though sparingly,) and well marked, as in the drawing, (see Fig. 3, page 95,) and resemble in every particular, the lacunæ and canaliculi of bone. They are placed lengthwise around the fang, those in

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proximity to the dentine joining with the terminal branches of the dentinal tubuli, while those upon the external surface radiate toward the periodontal membrane. By this arrangement, even after the extirpation of the dental pulp, the vitality not only of the cementum, but also of the dentine of the root is maintained. As age advances, or from exciting causes in adult life, the cementum frequently becomes hypertrophied, and constitues what is called *exostosis* of the roots.

The chemical composition of human *cementum*, according to Von Bibra, is—

Organic Substances, 29·42.
Inorganic Substances, 70·58.

OSTEO-DENTINE of Owen, or the SECONDARY DENTINE of Tomes.—This structure is frequently found in the pulp cavities of human teeth, either coalescing with the previously formed dentine, or as separate and distinct nodules; and in some instances the pulp cavity is occupied by an entirely calcified pulp, which has no connection with the walls of the cavity, and with proper management can be removed entire from its position. Under the microscope, this substance presents the *lacunæ* and *canaliculi* of bone and cementum, and in some rare instances the *Haversian canals* are also observable.

The different microscopical structures which have engaged our attention, as presented in the human teeth, are arranged upon a different plan in many of the lower animals. We have found, for instance, in making a *vertical* section of a human tooth, that the dentine of the crown is covered entirely by enamel, while that of the root is invested by the cementum, and this is true of the Quadrumana, and nearly all the Carnivora; but in the Herbivora, the Pachydermata, Ruminantia, Rodentia, etc., on making a *transverse* section of the crown of their teeth, the enamel, cementum, and dentine, are found upon the same plane.

By this arrangement, an admirable provision is made for the thorough comminution of the food upon which such animals subsist. Consisting as it does of grass, hay, or grain, considerable trituration or grinding is necessary, and owing to the presence

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of large quantities of silica, which is extremely hard, the teeth wear away rapidly, and on account of the different degrees of density of the various tissues, do so in an unequal manner; the cementum being the softest, wears most rapidly, the dentine next, and enamel the slowest of all. In this way an uneven and roughened exterior is presented by the masticating surface of the molars, like that in the opposing surfaces of the upper and nether stones in a grist-mill.

Much more could be said in connection with this interesting subject, for it has only been touched upon by me in the most general and elementary manner, but I will not trespass further upon your patience, as a considerable portion of your time has already been occupied.

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